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ABSTRACT

To determine vocational program costs at the secondary and post-secondary levels so as to assist state and local administrators in obtaining financial support, three high school districts and one community college district from each of seven states were surveyed. Items for which data were collected included: (1) direct expenditures of vocational programs, (2) total district expenditures, (3) master class schedule for each school in the district, (4) floor area of classrooms used for instruction, and (5) the number of full-time equivalent teachers for services and programs in the district. An analysis of the findings revealed that: (1) Appropriate proration of indirect costs for general support, and plant operation and maintenance is critical in determining the precise total cost of an instructional service, (2) High school districts place less emphasis on instructional equipment replacement than do community college districts, (3) Categorical support of vocational programs should be continued, (4) Strong consideration should be given to additional financing for industrial arts services, and (5) More efficient program-weighting factors are needed because they are neither sufficiently sensitive to local needs nor precise enough to be used in a state vocational fund's allocation system. Recommendations are included as are tables, sample instruments, and worksheets. (Author/SN)

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AN ANALYSIS OF VOCATIONAL PROGRAM COSTS

Daniel G. Aldrich, III

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University of California, Los Angeles
Graduate School of Education

1972

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AN ANALYSIS OF VOCATIONAL

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Daniel G. Aldrich, III

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1972

FOREWORD

The completion of this study was made possible through the generous assistance and guidance provided by a number of individuals. First, the author is greatly indebted to Professor Erick L. Lindman for his sage advice and continuous support as chairman of the doctoral committee. In addition, I wish also to thank him as director of the United States Office of Education project, Developing Alternate Models for Financing Vocational Education, for providing the financial support for this study.

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Daniel G. Aldrich, III
Investigator

TABLE OF CONTENTS

	Page
LIST OF TABLES	vi
LIST OF FIGURES	xi
LIST OF FORMULAS	xi

Chapter

I.	THE PROBLEM	1
	Introduction	1
	Need for the Study	3
	The Purpose of the Study	6
	Delimitation of the Study	6
	Definition of Terms	7
	Organization of the Study	10
II.	THE RATIONALE	12
	Budget Chart of Accounts	12
	Proration of Indirect Costs	17
	Base Unit of Measurement	21
	Cost-Estimating Formula	23
	Summary	26

Chapter Page

III. THE PROCEDURES 28

Development. 28

Budget Chart of Accounts 28

Direct Instruction 31

Indirect Instructional Costs 33

Non-instructional Service Grouping 34

Proration of Indirect Costs 37

Base Unit of Measurement 41

Cost-Estimation Formula 43

Application 45

Sample 45

Data Collection Procedures 46

Statistical Procedures 51

Summary 52

IV. ANALYSIS OF DATA 54

Analysis of Vocational Service and Program Instructional Costs 54

Program Instructional Costs 54

Classification of District Expenditure Objects 54

Proration of Indirect Costs 57

Total Vocational Service Cost 59

Base Unit of Measurement 62

Unit Costs 62

Cost Ratios 66

Chapter Page

Analysis of the Vocational Cost Estimation Formula 69

Variables 69

K Factor 71

Testing Formula (8) 71

Findings 77

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS 82

Summary 82

Introduction 82

Need 82

Purpose 84

Procedures 84

Data Collection 85

Statistical Procedures 86

Findings 87

Conclusions 89

Recommendations 92

BIBLIOGRAPHY 99

APPENDIX

A. Participating States and School Districts 102

B. Data Collection Instruments 105

C. Vocational Worksheets 109

D. High School District Cost Data and Ratios 112

E. Community College District Cost Data and Cost Ratios 136

LIST OF TABLES

Table		Page
III-1	Ratio of Contact Hours of Instruction per Semester Unit of Credit, by Program and College	42
IV-1	Summary of Current Expenditures for Selected High School and Community College Districts, FY 1969-70	55
IV-2	Proration Percentages for Indirect Instructional Service Costs, FY 1969-70	58
IV-3	Total Instructional Service Costs for Vocational Education, FY 1969-70	60
IV-4	Annual Student Contact Hours for Indicated Instructional Services and Programs, FY 1969-70	63
IV-5	Mean Cost per Annual Student Contact Hour for Indicated Instructional Services and Programs, FY 1969-70	64
IV-6	Mean Cost Ratios between Indicated Instructional Services and Programs and O.I.P., FY 1969-70	67
IV-7	Mean Class Size for Indicated Instructional Services and Programs, FY 1969-70	70
IV-8	Mean K-Factor for Indicated Instructional Services and Programs, FY 1969-70	72
IV-9	Comparison of the Sum of the Squared Differences between Actual Cost and Mean Cost per ASCH and Actual Cost and Estimated Cost per ASCH for Indicated Instructional Services and Programs, FY 1969-70	73
IV-10	Correlation between Cost per ASCH for Indicated Instructional Services and Programs, and Cost per ASCH for All Services and O.I.P., FY 1969-70	75
IV-11	Correlation between Cost per ASCH and Class Size for Indicated Instructional Services and Programs, FY 1969-70	76

Table		Page
D-1	Direct Current Expenditures for Courses in Agriculture, by High School District, for 1969-70	114
D-2	Direct Current Expenditures for Courses in Distribution, by High School District, for 1969-70	115
D-3	Direct Current Expenditures for Courses in Office, by High School District, for 1969-70	116
D-4	Direct Current Expenditures for Courses in Health, by High School District, for 1969-70	117
D-5	Direct Current Expenditures for Courses in Home Economics, by High School District, for 1969-70	118
D-6	Direct Current Expenditures for Courses in Technical, by High School District, for 1969-70	119
D-7	Direct Current Expenditures for Courses in Trade and Industry, by High School District, for 1969-70	120
D-8	Direct Current Expenditures for Courses in Industrial Arts, by High School District, for 1969-70	121
D-9	Total Direct Current Expenditures for Indicated Instructional Services and Programs, by High School District, for 1969-70	122
D-10	Annual Number of Student Contact Hours for Indicated Instructional Services and Programs, by High School District, for 1969-70	123
D-11	Percentage of Student Contact Hours for Indicated Instructional Services and Programs, by High School District, for 1969-70	124
D-12	Indirect Instructional Support Costs Prorated by Percentage of Student Contact Hours to Indicated Instructional Services and Programs, by High School District, for 1969-70	125

Table		Page
D-13	Full-Time-Equivalent Teachers for Indicated Instructional Services and Programs, by High School District, for 1969-70	126
D-14	Percentage of Full-Time-Equivalent Teachers for Indicated Instructional Services and Programs, by High School District for 1969-70	127
D-15	Indirect General Support Costs Prorated by Percentage of Full-Time-Equivalent Teachers to Indicated Instructional Services and Programs, by High School District, for 1969-70	128
D-16	Number of Square Feet of Classroom Space for Indicated Instructional Services and Programs, by High School District, for 1969-70	129
D-17	Percentage of Classroom Space for Indicated Instructional Services and Programs, by High School District, for 1969-70	130
D-18	Indirect Plant Operation and Maintenance Costs Prorated by Percentage of Classroom Space for Indicated Instructional Services and Programs, by High School District, for 1969-70	131
D-19	Total Indirect Cost for Indicated Instructional Services and Programs, by High School District, for 1969-70	132
D-20	Total Cost for Indicated Instructional Services and Programs, by High School District, for 1969-70	133
D-21	Average Cost per Student Contact Hour for Indicated Instructional Services and Programs, by High School District, for 1969-70	134
D-22	Cost Ratios for Indicated Instructional Services and Programs, by High School District, for 1969-70	135
E-1	Direct Current Expenditures for Courses in Agriculture, by Community College District, for 1969-70	138
E-2	Direct Current Expenditures for Courses in Distribution, by Community College District, for 1969-70	139

Table		Page
E-3	Direct Current Expenditures for Courses in Office, by Community College District, for 1969-70	140
E-4	Direct Current Expenditures for Courses in Health, by Community College District, for 1969-70	141
E-5	Direct Current Expenditures for Courses in Home Economics, by Community College District, for 1969-70	142
E-6	Direct Current Expenditures for Courses in Technical, by Community College District, for 1969-70	143
E-7	Direct Current Expenditures for Courses in Trade and Industry, by Community College District, for 1969-70	144
E-8	Total Direct Current Expenditures for Indicated Instructional Services and Programs, by Community College District, for 1969-70	145
E-9	Annual Number of Student Contact Hours for Indicated Instructional Services and Programs, by Community College District, for 1969-70	146
E-10	Percentage of Student Contact Hours for Indicated Instructional Services and Programs, by Community College District, for 1969-70	147
E-11	Indirect Instructional Support Costs Prorated by Percentage of Student Contact Hours to Indicated Instructional Services and Programs, by Community College District, for 1969-70	148
E-12	Full-Time-Equivalent Teachers for Indicated Instructional Programs and Services, by Community College District, for 1969-70	149
E-13	Percentage of Full-Time-Equivalent Teachers for Indicated Instructional Services and Programs, by Community College District, for 1969-70	150
E-14	Indirect General Support Costs Prorated by Percentage of Full-Time-Equivalent Teachers to Indicated Instructional Services and Programs, by Community College District, for 1969-70	151

Table		Page
E-15	Number of Square Feet of Classroom Space for Indicated Instructional Services and Programs, by Community College District, for 1969-70 . . .	152
E-16	Percentage of Classroom Space for Indicated Instructional Services and Programs, by Community College District, for 1969-70	153
E-17	Indirect Plant Operation and Maintenance Costs Prorated by Percentage of Classroom Space for Indicated Instructional Services and Programs, by Community College District, for 1969-70	154
E-18	Total Indirect Cost for Indicated Instructional Services and Programs, by Community College District, for 1969-70	155
E-19	Total Cost for Indicated Instructional Services and Programs, by Community College District, for 1969-70	156
E-20	Average Cost per Student Contact Hour for Indicated Instructional Services and Programs, by Community College District, for 1969-70 . . .	157
E-21	Cost Ratios for Indicated Instructional Services and Programs, by Community College District, for 1969-70	158

LIST OF FIGURES

Figure		Page
1	Methods for Prorating between Program Areas	19
2	Program Structure for Cost Analysis of Vocational Instructional Programs	30
3	District Vocational Program Budget Request	98

LIST OF FORMULAS

Formula		Page
1	Ratio for Prorating the Instructional Support Service Costs to the Vocational Instructional Service	38
2	Ratio for Prorating the Vocational Instructional Support Service Costs to the Vocational Programs	38
3	Ratio for Prorating the General Support Service Costs to the Vocational Instructional Service	39
4	Ratio for Prorating the Vocational General Support Service Costs to the Vocational Programs	39
5	Ratio for Prorating the Plant Operation and Maintenance Costs to the Vocational Instructional Service	41
6	Ratio for Prorating the Vocational Plant Operation and Maintenance Costs to the Vocational Programs	41
7	Determining Annual Student Contact Hours	43
8	Estimating Vocational Program Cost	45

CHAPTER I

THE PROBLEM

Introduction

The importance of vocational education to the welfare of the United States has, in recent years, become increasingly recognized. Schoolmen have accepted "a saleable skill" as an imperative need for all youth. (18:8-46) Within the past decade economists have stressed that education may be interpreted as an investment rather than as a consumer expenditure.[1] Other scholars have stated that our society has a critical need to improve the social and economic expectations of a large percentage of our citizens.[2] Many political leaders have become convinced of the importance of vocational education. Governor Ronald Reagan of California

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1. See the following as examples of such studies and statements:

   Benson, Charles S., The Economics of Public Education, Boston: Houghton Mifflin Company, revised 1968.

   Clark, Harold F., Cost and Quality in Public Education, Syracuse: Syracuse University Press, 1963.

   Schultz, Theodore W., The Economic Value of Education, New York: Columbia University Press, 1963.

2. See the following as examples of such studies and statements:

   Coleman, James S., et al., Equality of Educational Opportunity, Washington: U.S. Government Printing Office, 1966.

   Gardner, John W., Excellence: Can We Be Equal and Excellent Too? New York: Harper Colophon Books, Harper and Row, 1961.

   Kaufman, Jacob J., et al., The Role of the Secondary Schools in the Preparation of Youth for Employment, Chapters 1 & 12, University Park, Pennsylvania: Institute for Research on Human Resources, The Pennsylvania State University, 1967.

in a speech to the National Association of Secondary School Principals has stated:

> We have stressed college preparation too much in our public school systems. In doing so, public education has neglected the skills young people need to find and hold jobs in an increasingly technical society. One-fourth of our 18-year-olds do not have skills to obtain adequate employment, even at the entry level. These unemployable young people turn up on welfare rolls, as social dropouts, and as candidates for a lifetime of dependency and discontent. (30:1)

With this widespread acceptance of the need for vocational education, why is it still that "American education is preoccupied with the 20 percent of this country's youth who complete a college education and ignores the 80 percent who are learning to be unemployable?" (10:226)

One obstacle to expansion of vocational education has been the contention that it is more costly than other instructional programs. Aware of this problem, Congress, in the Vocational Education Amendments of 1968, made several changes in traditional vocational education policy. One of the most important of those was the Congressional direction to the state boards of vocational education that Federal vocational funds could no longer be allocated uniformly to local educational agencies. Individual characteristics of districts, in terms of needs, wealth, and costs had to be considered in all systems for allocation of Federal vocational funds. In relation to costs, the Act states that:

> In allocation of Part B funds due consideration will be given to the cost of vocational education programs, services, and activities, provided by local educational agencies which is in excess of the cost of education in such local educational agencies. (37)

Restated, the above indicated that the Federal monies were to be allocated to meet the difference in costs between vocational programs and

those of other instructional programs. To comply with that Federal allocation criterion, states and local educational agencies need to identify the cost difference. To accomplish that task has necessitated the determination of vocational program costs and unit costs. This study was conceived to assist state and local educational administrators in determining and estimating those costs.

Need for the Study

Determining educational costs has received the attention of researchers for almost seventy years. Cubberly (14:88-198) was among the first to investigate the variables involved in determining a unit base of educational expense. His historic work in educational finance precipitated further studies that have sought to refine the practices of analyzing expenditures so that more accurate educational cost estimates could be made.

Before 1960 only a few studies, such as that conducted by Harvey Henry Davis in 1928 (15), were addressed to the costs of various instructional programs. Since 1960 several additional studies have examined those costs.[3] Increased attention to the costs of instructional programs is attributable to various causes, of which three are most important. First, there now exists tremendously increased competition

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3. See the following as examples of such studies:

   Anderson, Ernest F., "Differential Costs of Curriculums in Comprehensive Junior Colleges," unpublished doctoral dissertation, University of Illinois, 1966.

   Cage, Bob N., Cost Analysis of Selected Educational Programs in the Area Schools of Iowa, Iowa State University, Ames, Iowa, 1968.

among all levels of government for a greater share of the tax dollar. Second, public demands upon educational systems for accountability have been continuously mounting. Third, the expansion of the community college movement with its dual concern for both college transfer programs and vocational programs has, in light of the above, required examination of these instructional programs.

Analysis of the procedures used in the studies cited above reveals two faults: weaknesses in program accounting; and the need for a better method of estimating instructional program costs.

The following paragraphs examine the need for this study from the standpoint of practice by state and local educational administrators. In 1969 a survey was conducted in fifteen State Departments of Education to ascertain whether procedures had been developed to identify the total

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3. Continued:

Parry, Ernest B., An Investigation of Cost Differentials Between Trade, Technical, and College Parallel Curriculums Offered in North Carolina's System of Comprehensive Community Colleges, University of North Carolina at Chapel Hill, 1968.

Robertson, Lyle R., "A System for Determining Educational Program Costs: Application to Comprehensive Community College," unpublished doctoral dissertation, Wayne State University, 1968.

Swanson, J. Chester, Program-Cost Analysis of Vocational-Technical Education in a Junior College and in a Unified School District, Office of Education, Bureau of Research, HEW, 1969.

cost of vocational programs.[4] Researchers identified two problem areas. First, the majority of State Education Departments had not developed program accounting procedures for vocational education. For example, in twelve of the fifteen states, vocational program costs were reported to varying extents for only the direct expenditures of instructional salaries and supplies. Other direct expenditures, textbooks and replacement of instructional equipment, were not generally identified. In addition, only three states had procedures to determine indirect program costs. New York prorated indirect costs on the basis of pupil hours of instruction. The other two multiplied a state-determined percentage (California, 24%; Utah, 20%) times the identified direct cost to ascertain the appropriate indirect cost. On the basis of the foregoing, the researchers concluded that procedures within most of the sampled states could not ascertain the total cost of a vocational program.

The second problem area was lack of an objective procedure for estimating and controlling the cost of approved vocational education courses and programs. In many instances legislatures were not approving

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4. Lindman, Erick L., Financing Vocational Education in the Public Schools, National Educational Finance Project, Special Study No. 4, 1970.

   The following states participated in the survey:

California	Minnesota	Tennessee
Colorado	New Hampshire	Texas
Florida	New York	Utah
Illinois	Ohio	Washington
Michigan	Oregon	Wisconsin

   Ten of the above states were chosen as a result of their returning a portion of their Title V ESEA money to USOE to finance the survey. Five other states were added so as to provide a better cross section of how states were financing vocational education throught the nation.

increased appropriations for vocational programs until their costs were more accurately determined.

Both research and field practice made apparent the need to assist state and local educational administrators in determining vocational program costs. A study that was addressed to those problems would be meeting current needs in vocational education and would be contributing to an area of applied research that had not yet been fully explored.

The Purpose of the Study

The purpose of this study is to determine vocational program costs at both the secondary and post-secondary levels for categorical fund support. That purpose necessitated the accomplishment of three objectives. First, current costs of vocational programs had to be identified. That objective required the development of a program accounting procedure that, in turn, entailed identifying:

1. a chart of accounts;
2. procedures for prorating indirect costs.

Second, once costs of programs were determined, appropriate program unit costs could be established, serving as a basis for meaningful cost comparisons. Development of such a basis was the second objective. Finally, a formula was created and tested, utilizing unit costs determined from the above, to estimate and control, for purposes of allocation, the cost of vocational programs--the third objective.

Delimitation of the Study

This study was limited to the fiscal year July 1, 1969, to June 30, 1970. The period September 1, 1969, to August 31, 1970, was utilized

for the academic year. This study considered the fiscal year and academic year to coincide. The above time period was chosen because it was the most recent in which the required data were totally accessible.

The study was limited to the establishment of cost per annual student contact hour of instruction for vocational programs, industrial arts programs, and other instructional programs. Omitted from this study was any consideration of costs for Manpower Development and Training Act Programs. Also excluded was any consideration of the expenditures for capital outlay and debt service. The rationale for this exclusion is given in Chapter III.

Definition of Terms

In order to minimize possible uncertainties of terms used in this study, technical terminology is defined below.

Agricultural Programs A group of courses involving knowledge and skills in agricultural subjects such as plant science, soil science, animal science, farm management, agricultural mechanization, and agricultural leadership.

Capital Costs Non-current long-term costs expended on items only partially consumed during the operation of a particular program or group of programs. Capital costs include site acquisition costs, capital improvement to the sites, physical plant and building costs, and initial equipment costs.

Comprehensive High School A secondary school with a number of departments (e.g., academic, industrial, business) offering a diversified program to meet the needs of pupils with varying interests and abilities.

Course An organized body of subject matter in which instruction is offered within a given period of time.

Current Costs Ongoing operating costs of a program.

Direct Costs Costs that can be attributed to specific instructional programs.

Distributive Programs Courses grouped primarily in marketing or merchandising of goods or services.

Full-Time-Equivalent Teacher An academic staff member who devotes his entire time to teaching.

Home Economics Programs Courses involving knowledge and skills in the following subjects: child development; family relationships; food and nutrition; clothing and textiles; family economics and home management; housing, home furnishings and equipment; and family health.

Indirect Costs Those current costs that represent overhead, administrative costs, and other expenditures that must be prorated among several programs.

Industrial Arts Programs Instructional shopwork of a non-vocational type that provides general educational experiences centered around the industrial and technical aspects of life today, and offers orientation in the areas of appreciation, production, consumption, and recreation through actual experiences with materials and goods. It also provides exploratory experiences that are helpful in the choice of a vocation.

Instructional Program A grouping of common courses of academic, professional, or technical training, given with a degree of specialization suitable for the level at which it is offered and for the institution proposing it.

Junior College (Community) An institution of higher education that offers the first two years of college instruction, frequently grants an associate degree, and does not grant a bachelor's degree. Offerings include transfer and/or terminal programs (with an immediate employment objective) at the post-secondary instructional level and also may include adult education programs. It is an independently organized institution. The term does not refer to the lower division of a four-year institution, even if that lower division is located on a campus separate from the campus of the parent institution.

Office Programs Courses that require knowledge of public and/or private enterprises and that are related to the facilitating function of the office. They include such items as recording and retrieval of data, supervision and coordination of office activities, communication, and reporting of information.

Official Class Enrollment The Average Daily Membership which is officially reported to the state for each class during the year.

Other Instructional Programs The courses provided by the examined institutions other than vocational, industrial art, and MDTA.

Proration The allocation of parts of a single expenditure to two or more different accounts in proportion to the benefit that the expenditure provides for the purpose, or program area, for which the accounts were established.

Student Contact Hour of Instruction One student scheduled to receive instruction for 50 to 60 minutes.

Technical Programs Courses that require understanding of the laws of science and principles of technology, as applied to modern design, production, distribution, and service.

Trade and Industrial Programs Courses that are planned to develop basic manipulative skills, safety judgment, technical knowledge, and related occupational information for the purpose of fitting persons for initial employment in industrial occupations and upgrading or retraining workers employed in industry.

Vocational Education (16) Vocational or technical training or retraining given in schools or classes (including field or laboratory work incidental thereto) under public supervision and control, or under contract with a state board or local educational agency, and conducted as part of a program designed to prepare individuals for gainful employment as semi-skilled or skilled workers or technicians in recognized occupations (including any program designed to prepare individuals for gainful employment). Vocational or technical training or retraining may be assisted by Federal funds under the Vocational Education Act of 1946 and supplementary vocational education acts, but excluding any program to prepare individuals for employment in occupations which the Commissioner determines, and specifies in regulations, to be generally considered professional or as requiring a baccalaureate or higher degree.

Organization of the Study

In the present chapter, the introduction briefly identified the need for vocational education as an instructional alternative in our schools. It also identified cost as an obstacle to its initiation or expansion as an instructional program. The introduction was then followed by a statement of the need for the study. Here it was revealed that weaknesses in past studies and practice in the field necessitated

additional research in determining and estimating vocational program costs. This, in turn, was followed by the purpose of the study, its delimitations, and definition of technical terminology.

In Chapter II a rationale for the study is developed through a review of literature. First, previous cost analysis studies are examined as to their program accounting procedures. Second, vocational cost estimation procedures are discussed.

The procedures used in this study and their rationale are explained in Chapter III. Of concern there are 1) the design of the chart of accounts; 2) the proration of the indirect costs; 3) the unit cost used for program comparison; 4) the formula for estimating vocational program cost; 5) the statistical procedures used in the data analysis.

Chapter IV analyzes the data that were collected. First, the vocational program cost data are examined. Second, the cost-estimating formula is analyzed. Third, the findings, revealed by the preceding, are identified.

In Chapter V a summary of the previous four chapters is presented. That is followed by the conclusions and recommendations suggested from the data analysis.

CHAPTER II

THE RATIONALE

The purpose of this chapter is twofold: first, to present a synopsis of procedures utilized by past studies in determining and estimating costs of vocational programs; second, to identify concerns about those procedures. It is because of those concerns that the procedures described in Chapter III were developed.

In order to focus the reader's attention upon areas of specific procedural concern, the chapter is organized into four sections. The first section examines the budget chart of expenditure accounts, as used by earlier studies in ascertaining the total program cost. The second section identifies the procedures for prorating indirect costs to the various instructional programs. The third section examines the base units utilized in program-cost comparison. Finally, the fourth section discusses the development of formulae for estimating the cost of vocational programs.

Budget Chart of Accounts

To determine the total cost of an instructional program, one must make a number of decisions regarding the structure of the budget expenditure accounts. The comptroller's budget has been history's answer to the problem of controlling the public purse and safeguarding it from the incompetent, misinformed, or untrustworthy. That budget, however, was not designed to meet the needs of a rational decision process required in identifying costs of specific programs.

Melvin Anshen has suggested several characteristics of a useful program budget structure (2:10) that, although proposed in connection with the federal budget, are equally meaningful in relation to the structure of budgets for educational institutions. His first suggestion is that the budget should facilitate meaningful measurement of the total cost of accomplishing defined objectives. Second, the budget structure should facilitate the comparison of the costs of various ways to accomplish a given objective. Third, the budget should clearly identify the future cost implications inherent in near-term financial commitments. Fourth, the budget design should facilitate the comparison of cost inputs and achievement outputs. Fifth, the budget should show the discrete spending commitments in a manner that permits significant cost-utility analysis. Sixth, the design of the budget should be such that aggregation of related expenditures is readily effected. (2:11)

The charts of accounts utilized in seven recent studies conceived to determine the cost of vocational programs fail to meet all of Anshen's standards. In 1966 Ernest F. Anderson conducted a study of Differential Costs of Curricula in Comprehensive Junior Colleges.(1) Two junior colleges were studied in each of the states of California, Florida, Michigan, and New York. Anderson utilized the following account structure:

1. Administration
2. Salary costs of teachers
3. Supportive instructional costs
4. Operation and maintenance of plant
5. Auxiliary services
6. Fixed charges
7. Other indirect costs (1:10-11)

In 1968 Bob N. Cage completed a cost analysis of selected educational programs in four area vocational schools and eleven area community

colleges in Iowa.(8) Cage used the following budgetary structure:

1. Instructional costs
2. Administrative costs
3. Operation and maintenance of plant
4. Auxiliary services
5. Fixed charges
6. Other indirect expenses (8:1)

The same year Ernest B. Parry examined cost differentials among trade, technical, and college-parallel curriculums offered in ten of North Carolina's comprehensive community colleges.(27) He utilized the following chart of accounts:

1. Instruction
2. Supplies and materials
3. Administration
4. Student personnel services
5. Plant operation and maintenance
6. Equipment maintenance
7. Fixed charges
8. Auxiliary services
9. Depreciation of equipment (27:57-69)

Also in 1968 Lyle R. Robertson created a system for determining educational program costs and applied the system to two community colleges in Michigan.(28) The expenditure account structure he developed is as follows:

1. Instructional costs
   a. teaching salaries
   b. academic administrative costs
   c. clerical support
   d. student help
   e. capital outlay
   f. all other operating costs

2. General support costs
   a. administration
   b. library
   c. student personnel services
   d. fixed charges
   e. operation and maintenance
   f. equipment (28:32)

The next year J. Chester Swanson conducted a program-cost analysis of vocational-technical education in a California unified school district and in a California junior college.(36) Swanson utilized the following budgetary structure:

1. Direct classroom expense
   a. teachers' salaries with fringe benefits
   b. instructional supplies
   c. instructional assistants' salaries
   d. other services, including clerical

2. Quasi-instructional services
   a. supervision (department chairmen, etc.)
   b. leaves, study hall, aides

3. Non-teaching services
   a. school administration, including clerical
   b. curriculum, guidance, etc.
   c. library and audio-visual aids
   d. student activities direction
   e. community relations
   f. buildings and grounds

4. School district central services
   a. general administration
   b. business services
   c. general supervision and curriculum development

5. Abatements--negative costs
   a. services sold
   b. products sold (36:19)

In 1970 Leland P. Baldwin created a cost accounting model to assess actual costs of vocational and nonvocational courses.(6) He tested his model in the community colleges of San Diego, California. The expenditure accounts which Baldwin used were:

1. Administration
2. Principals
3. Supervisors
4. Teachers
5. Registrar
6. Librarians
7. Counselors
8. Classified Salaries of Instruction
9. Books

10. Other Expenses of Instruction
11. Health Services
12. Salaries for Operation of Plant
13. Other Expenses for Operation of Plant
14. Maintenance of Plant
15. Contributions to Employees' Retirement
16. Other Fixed Charges (6:23-28)

The final study to be examined was completed in 1970 by James L. Wattenbarger, et al. That study analyzed program costs and cost differentials in selected community colleges in the states of California, Florida, Illinois, Massachusetts, New York, North Carolina, and Texas. (40) The authors utilized the following chart of accounts:

1. General Administration
2. Instructional Salaries
3. Supportive Instructional Costs
4. Operation and Maintenance of Facilities
5. Student Services
6. Instructional Resources
7. Auxiliary Services
8. Capital Outlay (40:20)

Examination of the budgetary account structures in each of the above studies revealed a problem regarding the suggested budget characteristics identified by Anshen. For example, his first characteristic is that a budget structure should make possible the meaningful measurement of the total cost of accomplishing defined objectives.(2:10) The objective of each of the above studies was to identify the cost of an instructional program. However, analysis of the account structures developed to achieve that end revealed inclusion of accounts for student services, for auxiliary services (transportation, food, health), and for community services, none of which was directly related to the cost of instruction. Inclusion of those service costs as part of the cost of instruction raised two concerns: First, this practice prohibited the public from clearly assessing the cost and the value of those additional

non-instructional services that the educational institutions were providing. Second, reported costs of the instructional programs were inflated.

The inadequacies of all seven budget structures indicate the need for development of a program- or service-oriented budget structure.

Proration of Indirect Costs

Indirect costs are costs that cannot be attributed to any one instructional program and must be prorated among all programs. The problem in allocating indirect costs is the development of a rational method that prorates those costs to instructional programs in proportion to the burdens they create.

Examination of the literature revealed that several proration procedures had been suggested. However, most of those procedures were developed for distributing indirect costs between two educational institutions that shared a common site, rather than among instructional programs within one institution. Nevertheless, those procedures, although suggested for the former situation, were equally applicable to the latter.

H. G. Badger in his manual on junior college accounting suggested five bases for allocating charges: direct charges, time, floor space, average daily attendance, and actual number of persons served.(3) He also proposed, in summary, the following five-step rule to junior college cost accounting:

1. Charge directly to the various units of the system or organization all items which can be so charged (salaries, supplies, etc., where used exclusively by one unit); then for items not thus allocable;

2. Charge salaries and wages in accordance with the percentage of time the individual

employees spent in or for the various units;

3. Charge costs of operation and maintenance according to floor space used by the various units of the system,weighting where necessary for comparative time the space is used or reserved;

4. Charge other administrative and instructional items (except student or faculty health service, student employment and placement service, and measurable items) in accordance with average daily attendance if this figure is kept for the entire corporate organization, otherwise use number of students enrolled as the basis; and

5. Charge measurable items (student or faculty health service, student employment and placement service, extension service, auxiliary enterprises, etc.) in proportion to number of persons served or for whom provided.(3:68)

The concepts of proration were also considered by the United States Office of Education, which in 1957 published an accounting manual prepared for the guidance of local and state school systems. In considering the prorating of expenditures, the publication enumerated and described seven bases: time, average daily membership or average daily attendance, time-floor-area, hour-consumption, number of pupils, mileage, and quantity consumed.(38) Figure 1, which is adapted from a table in the report, illustrates the seven different methods of proration among expenditure accounts in a school system. "P" indicates the preferred method, "A" an alternate method. "ADM" means average daily membership, while "ADA" refers to average daily attendance. Despite the identification of those procedures, a basic problem remained: how to apply them in prorating the indirect costs of an instructional program.

In the studies cited in the first section of this chapter, proration procedures were applied to ascertain indirect costs of an instructional program. The following briefly describes the method(s) used by

FIGURE 1

METHODS FOR PRORATING BETWEEN PROGRAM AREAS

Expenditure Accounts	Methods for Prorating						
	Time	Time-Floor-Area	ADM or ADA	Hour Consumption	Number of Pupils	Mileage	Quantity Consumed
ADMINISTRATION							
Salaries.....	P		A				
Other Expenses....			P				
INSTRUCTION							
Salaries.....	P		A				
Other Expenses....			A				P

Source: (38)

each author.

Anderson prorated indirect costs using two methods. First, services supportive to instruction were assigned on the basis of student credit hour of instruction. Second, supportive expenses that were not allocated to the instructional departments were distributed on the basis of the relationship of the direct salary cost of each department to the total direct salary cost of the institution.(1:12) Cage prorated on the basis of full-time-equivalent enrollment the expenses incurred by administration salaries, operation and maintenance of plant, and other indirect expenses.(8:18) Parry prorated indirect costs for administration, student personnel services, equipment maintenance, fixed charges, and auxiliary services on the basis of membership hour of instruction. Plant operation and maintenance costs were prorated on a combined basis of square footage and membership hour.(27:57-69) Robertson prorated the indirect general support costs by multiplying the number of student credit hours each course was worth per student times the general support cost per credit hour. The latter figure was obtained by dividing the total general support costs by the total institutional credit hours.(28:31-38) Baldwin prorated each of the California School Expenditure Accounts using, where he determined applicable, ratios such as number of class sections for a course to total number of class sections in the district, number of students enrolled in a class section to total number of students enrolled, and a formula involving square footage, weekly hours of occupancy, and number of class sections sharing instructional space during a given semester. (6:29-34)

To summarize the proration procedures used above, most of the indirect costs were distributed utilizing one of the following procedures:

student enrollment, student contact hour of instruction, or student credit hours of instruction. Exceptions to this were two studies in which, additionally, a square footage factor was utilized to prorate the indirect costs of plant operation and maintenance. The problem identified as a result of the above procedures is whether one procedure could adequately distribute all indirect costs proportionately among the various instructional programs. Guidelines suggested by Badger(3) and the United States Office of Education(38) tended to indicate the need for utilizing more than one proration method. For example, proration of costs between vocational instructional programs and other instructional programs on the sole basis of an enrollment ratio would produce low vocational indirect costs because of low vocational student enrollment. However, proration of the indirect costs of plant operation and maintenance utilizing an instructional square footage ratio would produce much higher indirect costs for vocational education because the floor area per student in vocational courses is high.

Base Unit of Measurement

> ...a unit cost is some division or multiple of a service or a material used in the school system in terms of dollars expended. It is made for a specific purpose.... (23:65)

In 1905 George D. Strayer completed the first major unit cost study. His study was designed to develop accounting procedures to enable school administrators to assess expenditure against charges.(34) Strayer's unit to express educational costs was average daily attendance. That selection was based on the rationale that

> ...the school has to provide teachers buildings and equipment for more than the average daily attendance, and yet it is seldom that provision is made

for a number equal to average daily enrollment. (34:9-10)

This initial work by Strayer and also the work of Elwood P. Cubberly(14) established a pattern for utilization of base units in the analysis of costs by future researchers.

Following the above efforts, the financial aspects of education were examined by several individuals under the auspices of the American Council on Education. First, a cost study by Strayer and Haig developed a unit base consisting of number of class sessions times the number of hours per session times the average daily attendance.(35:68) That approach injected the element of time in addition to the generally accepted attendance base. A second study conducted by R. O. Stoops also utilized time as a component of the unit base. His unit was cost per pupil per year.(33.3) Charles W. Hunt also conducted a unit cost study that used average daily attendance as its base. Hunt, expanding on Strayer's 1905 rationale, stated:

> This number is the fairest base for estimating costs which must, in the long run, be calculated upon usual or average conditions and not upon emergencies. The total enrollment is not a fair base, for it includes all pupils who might be in school during the year, and is often more than the number who actually attend at one time and must be provided for. (19:8)

In 1925 Stevens and Elliott in their study, Unit Costs of Higher Education, discussed their selection of the student clock hour over the student credit hour as a base unit.(32) The authors stated:

> The difficulty is that 'credit' is a local term, meaning quite different things in different institutions. For instance, a credit in an institution operating on the quarter system means twelve weeks' work, while in an institution operating on the semester plan it means eighteen weeks' work. Even in the same institution the credit is represented by a wide range of actual hours of instructional

> contact, as may be noted in the case of chemistry and mathematics.
> The argument for the student clock hour rests largely on the fact that it is easily explained to the layman, that it does not depend upon local or special definitions of credits, and that it does show more adequately the laboratory instruction. The student clock hour is a more universal unit. While credits are registered for, it is in reality the contact, the scheduled appointment for instruction between student and teacher, that is the essential thing. (32:77)

The total student clock hours per course was the product of total clock hours of the course multiplied by student enrollment in that course.

Since Stevens and Elliott's use of the student clock hour as a unit base, it has been used repeatedly. Joyal used it in his study examining the different costs for different teaching situations in the early 1930's (20:359-453). Badger used it in his study of public and private junior colleges in 1944 (4:17-76) and in another study in 1953 (5:389-396). Martin (25:13) also used it in his 1949 study, as did Colvert (13:396-401) in 1957.

In the recent vocational unit cost studies, researchers such as Cage (8:18), Parry (27:71), and Swanson (36:2-3) also utilized the clock hour or contact hour as their base unit. However, others such as Anderson (1:11), Robertson (28:96), and Wattenbarger (40:52) chose the credit hour. Their usage of the credit hour, with its problems as identified by Stevens and Elliott (32:77), caused concern about the accuracy and comparability of their identified program costs.

Cost-Estimating Formula

The development and testing of formulae for estimating the costs of vocational programs have been extremely limited. Most recent studies have dealt with identification of vocational program costs through

extensive accounting procedures. Once these costs were determined, they were then compared to the cost of general education, in order to identify an appropriate cost ratio between vocational programs and general education that could then be utilized as a weighting factor to estimate the future cost of each. For example, Anderson stated:

> The results of this study should then be used to develop a method of weighting students...according to the type of curriculum in which they are enrolled. Full-time-equivalent students in Engineering Technologies would be weighted 2.0, Health and Medical Occupations 1.5, Industrial Technical Occupations 1.5, Dietetics and Home Economics Occupations 1.2, Business and Office Occupations 1.0. (1:81)

Wattenbarger recommended:

> Federal and state legislators should be encouraged to become familiar with the differentials in program cost and to recognize this information in determining appropriations. (40:129)

Use of the above procedure made two critical assumptions with regard to vocational cost estimation. First, the cost of a vocational program is directly related to the cost of a general education program. In other words, as the cost of general education went up or down within a school district or state, so correspondingly did the cost of vocational education. Second, the use of a constant weighting factor in estimating costs presupposes only minor variation in cost within a specific vocational program. As revealed in Chapter V of this study, neither assumption is correct.

A thorough review of the literature revealed only one study, conducted by Leland P. Baldwin, that attempted to develop a cost estimation formula utilizing various components. Baldwin described his formula as follows:

Starting with the total amount for current expenses, teachers' salaries including district contributions for insurance and retirement were subtracted. From this result the expenses of the district vocational department, including coordinators' salaries, clerical salaries, and attendant contributions for insurance and retirement, were deducted to obtain the expenses associated with administration and operational activities. These latter expenses divided by the total number of class sections for the year in the district, including those for the summer session, gave a general administration and operational cost for each section. Similarly, vocational department expenses were divided by the total number of vocational class sections to determine the average cost per vocational class section arising from coordination activities.

For a selected course, the prorated amounts of the teacher's salary for each class section were added together and multiplied by a factor that accounted for district contributions for insurance and retirement. The administration and operational costs for each class section were also added. The final sum represented course cost.

In symbolic language the foregoing verbal description was written as:

$$C = (A+VxK)S \times (1+r) \times (T_1+T_2\ldots+T_n)$$

where

C = Course cost

A = Administration and operational expenses per class section.

V = Vocational department expenses per vocational class section.

K = Multiplier for vocational/nonvocational courses.

K = 0 for nonvocational subjects.

K = 1 for vocational subjects.

S = Number of class sections in the course.

r = Fraction of certificated salaries that district pays out for insurance and retirement.

T_1, T_2, etc. = Prorated portion of teacher's salary for each class section of the course. (6:40-41)

Testing this model, Baldwin found that it produced course cost differences of up to 21 percent when it was compared to his detailed cost analysis procedure.(6:41) On the basis of that finding, the author suggested that further research needed to be completed.

Summary

Critical areas of concern in studies that determine and estimate the cost of vocational programs are:

1. budget chart of accounts
2. proration of indirect costs
3. base unit of measure
4. development of cost estimation formula

The preceding sections of this chapter analyzed, according to the above, recent studies conceived to determine the costs of vocational programs. The following paragraphs summarize the findings of that analysis.

First, the budget account structure utilized by each study reviewed, included as part of the cost of instruction the accounts for student services, for auxiliary services (transportation, food, health), and for community services. Inclusion of these service costs raised two concerns:

1. The practice prohibited the public from clearly assessing the cost and value of those additional non-instructional services that their educational institutions were providing.

2. Reported costs of the instructional programs were inflated.

Second, most of the writers of the reviewed studies allocated indirect costs utilizing one of the following procedures: student enrollment,

student contact hour of instruction, or student credit hour of instruction. Exceptions to that were two studies in which, additionally, a square footage factor was utilized to prorate the indirect costs of plant operation and maintenance. Since most researchers used only one proration procedure, concern was expressed as to whether this could adequately distribute all indirect costs proportionately among various instructional programs. Guidelines suggested by Badger (3:68) and by the United States Office of Education (38) indicated the need for utilizing more than one proration method.

Third, three investigators within the reviewed studies utilized the clock hour or contact hour as their base unit of cost comparison. However, three other researchers chose the credit hour as their base unit of measure. Usage of this latter base unit, with its problems as identified by Stevens and Elliott (32:77), caused concern as to the accuracy and comparability of the identified program costs.

Fourth, only one study could be found that attempted to develop a cost estimation formula utilizing various components. Testing of that model found that it produced course cost differences of up to 21 percent from those produced by the detailed cost analysis procedure.

From the above findings the subsequent conclusions were made:

1. Procedures used for determining the cost of instructional programs were inadequate.
2. Additional research was needed in the development of an instructional program cost estimation formula.

CHAPTER III

THE PROCEDURES

This chapter describes the methods used to determine and estimate vocational program costs in the sampled secondary and post-secondary school districts. The chapter is organized into two sections, Development and Application. Subsections of the Development section describe the rationales for the accounting structure, for the proration of indirect costs, for the base unit of measure, and for the vocational cost estimation formula. Subsections of the Application section identify the research sample, the data collection procedures, which incorporate the preceding rationales, and the statistical procedures.

Development

Budget Chart of Accounts Development of a program accounting structure for determining the total cost of an instructional program necessitated making a number of decisions regarding what expenses to include and how to classify them. Chapter II revealed that in ascertaining an instructional program's cost, past studies had incorporated all institutional expenditures within that cost. In light of the public's increased rejection of requests for additional educational funds and its demands for greater accountability at current support levels, the foregoing practice appeared inadequate. What seemed to be needed is an account structure that identified and grouped separately the services offered by schools. Such a structure would better enable the public and its legislative representatives to assess more precisely the actual cost

and value of the services that schools were providing. Examination of existing program structures revealed that besides the service of instruction and its supporting activities, schools were also providing services for food, health, and transportation, as well as for student and general community activities. Because those services are non-instructional, they should not be prorated to the cost of an instructional program, but costed separately.

The budget chart of accounts developed in this study incorporates the foregoing rationale. It also adapts various aspects of the program accounting procedures recommended by the California State Department of Education Manual for Planning, Programming, and Budgeting Systems.(9) Figure 2 skeletally illustrates the budget chart of accounts used. It defines four distinct levels: Level I, district, high school or community college; Level II, general service grouping; Level III, service grouping; and Level IV, program grouping. In the following paragraphs each level and its purpose in the account structure are discussed.

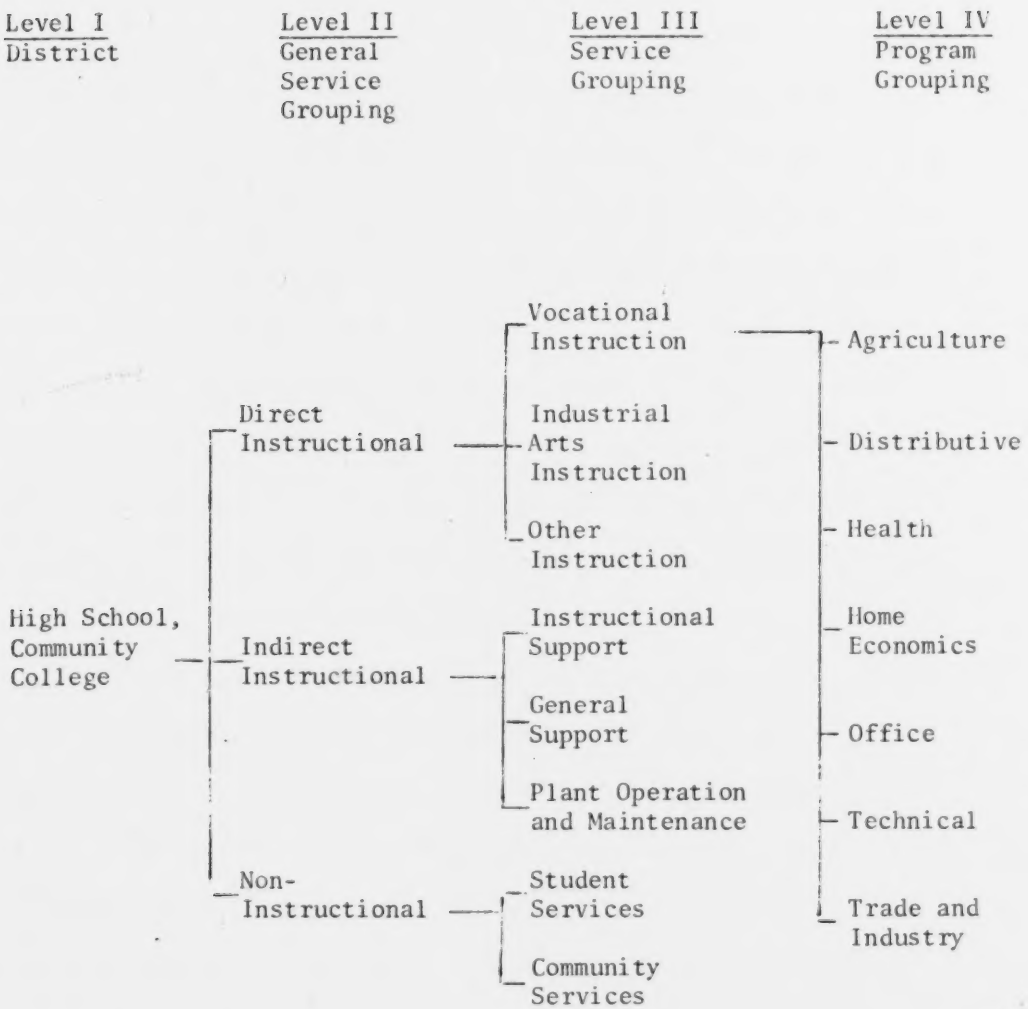
Level I, for purposes of this study, limits the cost analysis rationale to high school and community college districts. That limitation, however, does not exclude this structure from future adaptation for use at elementary or university levels.

Level II identifies the three general service groupings: direct costs of instruction, indirect costs of instruction, and non-instructional costs. Those three groupings provide the basic framework for identification of those accounts that are:

1. directly charged to an instructional program;
2. prorated by some variable to an instructional program;

FIGURE 2

PROGRAM STRUCTURE FOR COST ANALYSIS
OF VOCATIONAL INSTRUCTIONAL PROGRAMS



3. not charged to an instructional program.

Level III illustrates the service groupings and their relationship to Level II. Those services provided the functional framework into which expenditure accounts of an institutional financial statement were classified. Each service grouping and its objects of expenditures are identified and discussed below.

Direct instruction comprises the three Level III curricular services, other instruction, industrial arts instruction, and vocational instruction. That classification is required so that the cost of vocational programs can be differentiated from the cost of other instructional programs. To illustrate the need for such differentiation, the following is cited. Industrial Arts programs were reasoned to be similar in cost to the high-cost vocational programs, for their class sizes and facilities were approximately the same. However, by federal regulation (37) their cost may not be classified with that of vocational education. But inclusion of the cost of industrial arts as part of the cost of other instructional programs would inflate the cost of the latter and produce a low, imprecise cost ratio of vocational education to other instructional programs. Industrial arts service within the sampled high school districts is, therefore, classified separately. The sampled community college districts do not offer that curricular service.

Objects of expenditure within direct instructional service account for about 65 percent of the cost of instructional programs. The objects identify those costs that are attributed to specific resources consumed in the process of rendering a specific instructional service. In this study, the following objects are so classified:

1. Directors', Consultants', or Supervisors' Salaries

2. Teachers' Salaries

3. Secretarial and Clerical Salaries of those directly assisting Directors, Supervisors, and Teachers

4. Other Salaries of Instruction (Teaching Aides)

5. Textbooks to include:

    a. new adoptions
    b. supplementary books
    c. workbooks

6. Teaching supplies

7. Replacement of instructional equipment

8. Cost of other items consumed in instruction

Examination of the above accounts reveals several changes in the traditional instruction object classification. First, objects such as the salaries of principals, of their secretarial and clerical staffs, and of other instructional staff (librarians; guidance and psychological personnel), as well as costs for libraries and audiovisual materials, are omitted on the basis that none of those accounts can be charged directly to a specific instructional service. Each account has to be either omitted from instructional charges or prorated on the basis of a precise proration variable. Second, salaries for directors and expenses for replacement of instructional equipment are added to the direct cost of instruction. Instructional equipment replacement can be easily identified as part of a specific instructional program, and is so charged. However, why include the salary of a director who probably performs duties similar to those performed by other administrative personnel? The rationale for that addition is as follows. To provide vocational education usually mandates the performance of additional administrative

services. The program requires special reports to qualify for state and federal categorical aids. Moreover, the program requires large amounts of special equipment and supplies that increase administrative burdens related to equipment procurement and maintenance. Inclusion of those additional administrative burdens within general administration costs would obscure the actual cost of providing vocational education as an instructional service. Therefore, the account for directors' salaries is added as a direct cost of instruction.

Indirect instructional costs comprise the three services, Instructional Support, General Support, and Plant Operation and Maintenance. Those service groupings provide a structure wherein objects prorated in a similar manner can be classified (proration procedures are described in the next subsection). Identification of objects within each indirect service group follows.

Instructional Support includes those objects that have as their purpose assistance to teachers or the general improvement of the curriculum. Objects in that service are:

1. Librarians' Salaries
2. Audiovisual Personnel Salaries
3. Instructional Television Personnel Salaries
4. School Libraries and Audiovisual Materials
5. Inservice Training
6. Sabbatical Leave
7. Curriculum Development, including District Directors of Curriculum and their staffs
8. Tutorial Services
9. Attendance Services

10. Commencement

General Support includes those objects that provide district-wide or institutional-wide administrative, technical, and logistical support. The objects so classified are:

1. Administration, to include salaries of most district administrators, their assistants, secretarial and clerical personnel, and supplies:

    a. Board of Education
    b. Superintendent
    c. Business Services
    d. Personnel Services
    e. Warehousing and Distribution
    f. Data Processing

2. Principals' Salaries, to include Salaries of Vice-Principals and of secretarial and clerical personnel assisting them.

3. Fixed Charges:

    a. Contributions to Employee Retirement
    b. Insurance
    c. Rental of Land and Buildings

Plant Operation and Maintenance includes objects for general upkeep and physical operation of school buildings. Objects within that service are:

1. Salaries of grounds and building personnel;

2. Costs of replacing non-instructional equipment;

3. Utilities;

4. Custodial supplies, etc.;

5. Other Expenses.

The Level II non-instructional service grouping comprises the Level III services: student service and community service. The purpose of that grouping, as stated previously, is to identify to the public

those non-instructional services that schools are providing. Classified within Student Services are the following:

1. Salaries of guidance and psychological personnel
2. Health Services
3. Transportation Services
4. Food Services
5. Student Body Activities

Grouped within Community Services are the objects:

1. Recreation
2. Civic Activities
3. Public Libraries
4. Custodial and Detention Care of Children

Separate identification of the above services not only enables clearer assessment of their value, but it also eliminates a potential problem of double financial reimbursement. For example, most states provide separate categorical aid for school transportation. However, if transportation were also prorated and included within the cost of vocational education, districts would in addition be receiving some of their vocational categorical funds on the basis of the cost of transportation. Thus, double reimbursement would occur.

To summarize briefly Level III, eight service groupings are identified: three types of instructional service; instructional support; general support; plant operation and maintenance; student services; and community services. Those service groupings enable more meaningful classification of expenditure objects reported in currently used function-object fiscal reporting documents.

The reader may have noted that omitted from the above is any consideration for capital expenditures and debt service. Practices in public school accounting dictate the omission, for the concept of depreciation seldom has been used except for the purpose of determining the insurable value of buildings and equipment. In some instances, however, state support for pupil transportation has included an amount for the depreciation of school buses. The practice of permitting annual payments to a school district for depreciation of school buses is based upon the assumption that the school district will accumulate a replacement reserve that will be available when the bus is to be replaced. Experience has indicated, however, that such reserves become the target of demands for reductions in the school tax rate or for increases in teachers' salaries. Consequently, a reserve fund has seldom been retained for its intended purpose, and most states and districts prefer that the state contribute toward the purchase of transportation equipment during the year the school district actually makes a purchase.

Similarly, if the state is to contribute to the purchase of instructional equipment for vocational education, the contribution should be made when the equipment is purchased--not as annual allowances for depreciation during the life of the equipment. Therefore, the cost of depreciation of vocational equipment must not be included in determining an allocable program-cost difference. Current practices mandate the separate identification of a vocational program's current and capital costs. This study, however, identifies differences only in current costs of vocational and other instructional programs.

Finally, Level IV of the program structure illustrates the seven program groupings of the vocational education curricular service as

identified by the United States Office of Education and as uniformly interpreted for reporting purposes by all states and by all local districts. Level IV represents the highest degree of cost analysis in this study and is the level at which unit costs of vocational programs are calculated.

Proration of Indirect Costs Utilizing the preceding program structure, this study ascertains costs for other instructional and industrial arts service at Level III and for vocational education services and programs at Levels III and IV. Costs within the above include, as previously indicated, only objects of direct expenditure. Because the total cost of an instructional program and non-instructional service includes both direct and indirect costs, this study has developed formulas for prorating the indirect service costs within Level III to services and programs at Levels III and IV. It was found that current non-instructional services were not extensively provided for by school districts. As a result, in this study indirect support costs were prorated solely to instructional services and programs. However, if in the future non-instructional services expand, then indirect support costs should be prorated to them in proportion to the burdens that they create.

Chapters I and II reveal that, although agencies have suggested usage of different variables to prorate the various indirect accounts, the current field and research practices in allocating indirect expenditures are imprecise. The account structure developed in this study classifies indirect costs into three services: Instructional Support, General Support, and Plant Operation and Maintenance. That classification provides a grouping of accounts that can be readily prorated utilizing a ratio similar to, but more precise than, existing ratios. Subsequent paragraphs explain the rationale for prorating each of the aforementioned

indirect services.

Instructional Support includes activities aimed at improving the quality of teaching and the curriculum. To support that definition, cost accounts for school libraries, audiovisual services, and curriculum development are assigned to that service. Because those activities are designed to benefit the student, it is logical to allocate those costs in proportion to the amount of instructional service each program provides. A good measure of the amount of instruction provided is the Annual Student Contact Hour of Instruction (ASCH). That measure is defined as the product of the total course enrollment, hours per week of instructional contact, and number of weeks that the instruction was provided. To allocate the Instructional Support Service costs to the vocational instructional service, the following formula is utilized:

$$\frac{\Sigma \text{ ISASCH}}{\Sigma \text{ AISASCH}} \qquad (1)$$

where

ISASCH represents a specific Instructional Service's Annual Student Contact Hours within the district.

AISASCH represents All Instructional Services' Annual Student Contact Hours within the district.

To distribute the Vocational Instructional Support costs, determined above, among the separate vocational programs, the following formula is used:

$$\frac{\Sigma \text{ VPASCH}}{\Sigma \text{ VISASCH}} \qquad (2)$$

where

VPASCH represents the district Annual Student Contact Hours within a specific vocational program.

VISASCH represents the district Vocational Instructional Service Annual Student Contact Hours.

The General Support Service provides district-wide or institution-wide administrative, technical and logistical support. Accounts assigned to this service are fixed charges, superintendents' salaries, principals' salaries, personnel services, and business services. Examination of those objects reveals them to be more directly related to the support of instructional staff than to students or the instruction that they receive. On this basis it appears that a measurement of the number of full-time-equivalent teachers can best allocate the expense of the General Support Service to instructional services and programs. Utilizing such a measurement, the following formula is used to allocate that service's costs to the vocational instructional service:

$$\frac{\sum \text{ISFTET}}{\sum \text{AISFTET}} \qquad (3)$$

where

ISFTET represents a specific Instructional Service's number of Full-Time-Equivalent Teachers within a district.

AISFTET represents All Instructional Services' number of Full-Time-Equivalent Teachers within the district.

To distribute the Vocational General Support costs, determined above, among the separate vocational programs, the following formula is used:

$$\frac{\sum \text{VPFTET}}{\sum \text{VISFTET}} \qquad (4)$$

where

VPFTET represents a specific vocational program's number of Full-Time-Equivalent Teachers within a district.

VISFTET represents the district Vocational Instructional Service's number of Full-Time-Equivalent Teachers.

The final indirect service to be prorated to instructional services and programs is Plant Operation and Maintenance. An appropriate measurement for allocating that service expense, as identified by the United States Office of Education Accounting Handbook (38), is floor area (square footage). The basic rationale for that measurement is that the dominant Plant Operation and Maintenance costs, custodial salaries, and utilities consumption are directly proportional to square footage.

Examination of schools reveals that they include two types of areas, classroom and ancillary (halls, lavatories, principals' offices, et cetera). A possible concern is whether one area type can achieve an adequate proration of the Plant Operation and Maintenance expense. For example, if the institutional area of ancillary services were large, proration of their Plant Operation and Maintenance costs by classroom square footage alone would result in an inflated program allocation. However, a recent survey in the State of Washington indicates that the use of one type of square footage is justifiable.

During the 1969-70 school year the Washington State Department of Education conducted an extensive facility usage survey in its school districts (39). In a sample of eighteen high schools, the survey revealed that classroom square footage comprises 68 percent of the total school square footage. On the basis of that information and discussions with state representatives from each of the participating states in this study, the school ancillary square footage to classroom square footage ratio of 30:70 was assumed to be virtually uniform among all districts. In a subsample of six districts, a test was conducted to determine whether allocation of Plant Operation and Maintenance costs using the square

footage ratio produced a large unit cost difference when compared to the unit cost produced using only classroom square footage. The results revealed an average one-cent lower cost per annual student contact hour for the square-footage ratio. Therefore, it was assumed that proration utilizing only classroom square footage would not result in an unjust cost distribution. The following formula is used to distribute Plant Operation and Maintenance costs among the instructional services:

$$\frac{\sum \text{ISCSF}}{\sum \text{AISCSF}} \qquad (5)$$

where

ISCSF represents a specific Instructional Service's Classroom Square Footage within the district.

AISCSF represents All Instructional Services' Classroom Square Footage within the district.

To allocate the Vocational Plant Operation and Maintenance costs, determined above, among the separate vocational programs, the following formula is used:

$$\frac{\sum \text{VPCSF}}{\sum \text{VISCSF}} \qquad (6)$$

where

VPCSF represents a specific vocational program's Classroom Square Footage within a district.

VISCSF represents the district Vocational Instructional Service's Classroom Square Footage.

Base Unit of Measurement To identify clearly the difference in cost among vocational programs, industrial arts service, and other instructional services necessitated the identification of an appropriate base unit of measure. Chapter II reported Stevens and Elliott's (32:77)

rationale for utilizing the student contact hour instead of the credit hour as their base unit. Shymoniak in The Analysis of Costs and Effectiveness of Vocational Education Programs in Three Selected California Community Colleges (31) points out that the ratio of contact hours to credit hours varies significantly from school to school and from program to program. He presents the following table showing the ratio of weekly contact hours to credits for various instructional programs in three community colleges.

TABLE III-1

RATIO OF CONTACT HOURS OF INSTRUCTION PER SEMESTER UNIT OF CREDIT, BY PROGRAM AND COLLEGE

Program	College A	College B	College C	Average
General Education	1.31	1.41	1.21	1.31
Agriculture	----	----	1.49	1.49
Distributive	----	1.00	1.34	1.17
Office	1.29	1.00	1.22	1.17
Health	2.64	1.73	2.24	2.19*
Technical	1.62	1.46	1.58	1.55
Trade & Industry	1.44	1.46	1.58	1.49

Source: (31:100)

*A recalculation of this average reveals it to be 2.20.

The table clearly indicates that if credits were used as the base unit of cost comparison, vocational costs (with the exception of the Office and Distributive programs) would be inflated when compared to general

costs. To correct that problem and clearly identify the cost difference between the vocational and other instructional services, this study uses the annual student contact hour as its base unit of comparison. This unit is derived using the following formula:

$$ASCH = \sum SE \times HOI \times WIC \qquad (7)$$

where

ASCH represents Annual Student Contact Hours per course
$\sum$ SE represents Annual Student Enrollment in course
HOI represents Hours per Week of Instruction in course
WIC represents Weeks in Course

Cost-Estimation Formula State and local educational administrators' need for a vocational program cost-estimation formula was described in Chapter I. In Chapter II the cited research indicated that the development of a formula had been limited. Creation of an appropriate formula required the accomplishment of two tasks. First, the identification of variables that can adequately describe the cost of vocational programs. Second, the algebraic arrangement of those variables into an appropriate relationship. Described below are how those two tasks were accomplished.

Analysis of the cost of a vocational program suggested three variables that can affect estimates:

1. teachers' salaries, the major expense of any instructional program
2. class size
3. additional costs for supplies and replacement of equipment.

Substantiation of the preceding was indicated by Keene, who stated that:

> To determine the weightings...two bases have been suggested in this study; class size, and special

> laboratory equipment depreciation. In some school systems salary might be used as a differential component if a different salary scale is used for different types of programs. (22:77)

Anderson also stated:

> The average cost per student credit hour is a function of the following four factors: (1) salaries paid instructors of classes included in the curriculum, (2) the teaching load of instructors in total contact hours, (3) class size, and (4) cost of supplies and other supportive services for teaching. (1:81)

Cage additionally stated:

> One possible solution is to weight the programs in the area schools according to cost, as determined by the factors of enrollment, salaries, supplies, etc....(8:20)

With the foregoing as a basis, listed below are the formula variables used in this study.

Vc represents the total cost per annual student contact hour of the vocational instructional service or programs in the district;

$\overline{C}$ represents the average cost per annual student contact hour of all instructional services in the district (contained within this variable are the average program direct and indirect costs);

$\overline{N}$ represents the average student-faculty ratio for all instructional services in the district;

N represents the average student-faculty ratio for a vocational program in the district;

K represents a mean program factor that reflects unusual requirements of the vocational program not related to class size (i.e., additional supplies, equipment, and indirect costs, etc.).

The algebraic arrangement of the above variables used in this study was initially conceived by Lindman (24:79). He suggested that the per-student cost of a vocational program is equal to the average

instructional cost per student times the ratio of the average class size for all services to the average class size of the vocational program, plus a program factor. That was expressed symbolically as:

$$Vc = \overline{C}\ (\overline{N}/N + K) \qquad (8)$$

His Vc, $\overline{C}$, $\overline{N}$, N, and K were defined in a slightly different manner; however, their adaptation to the preceding variable definitions can be made. Regarding the formula, Lindman stated, "While it appeared to have possibilities, additional research is needed to test how accurately it predicts costs." (24:79) The procedures described in the foregoing subsections provided the unit costs of vocational programs. Those costs were then used to test the above formula.

Application

Sample To analyze adequately the cost of vocational programs required selection of a large sample of school districts. The investigator decided that, given the limitations of time and money, three high school districts and one community college district from each of seven states would provide the most representative sample. States that participated were chosen from the sample of fifteen states surveyed in the 1970 study by Lindman (24). Each of the seven states was selected on the basis of its State Department of Education's interest and willingness to assist the investigator in the conduct of the study. Participating school districts were selected by personnel in each state's Division of Vocational Education. Districts were chosen on the basis of the following criteria:

1. High School District
   a. Each district had comprehensive high schools with student enrollment in grades 10-12.
   b. Each school within the district offered at least three vocational programs.

c. Each school had traditional class scheduling.

d. Each school had a master class schedule available.

e. Each district was within driving distance of the others.

2. Community College District

a. Each district had comprehensive community colleges with a minimum of 30 percent of its enrollment in vocational programs.

b. Each college within the district offered at least three vocational programs.

c. Each college had traditional class scheduling.

States and districts that participated in the study are identified in Appendix A. Two states requested and received an addition of one high school district to the sample.

Data Collection Procedures Collection of data needed for this study necessitated the development of data-collection instruments and the training of individuals in their use. Instruments were initially developed during November and December, 1970. The instruments were modified as a result of their being tested in a pilot high school and community college district in the Los Angeles area (for instruments used, see Appendix B). Fellow researchers were then trained in the following five-step collection procedures.

The first step was to have the District Director of Vocational Education indicate the vocational programs offered within the district. Next, it was necessary to identify the state-approved vocational courses within those programs. For example, discussion with the Vocational Director might reveal that within the program "Office," the district had both an approved secretarial course and a data-processing course; within the program "Health," it had an approved nursing course; and within the

program "Trade and Industry," it had approved courses in automotive repair, welding, and drafting. After approved vocational courses had been identified, it was necessary to identify the Industrial Arts courses that were being offered. (The vocational programs, plus industrial arts offered in the district, were then indicated appropriately on Forms II and III.)

The second step was to obtain a copy of the district expenditures for the fiscal year 1969-70. Those expenditures had to be as detailed as possible and had to indicate the actual expenditures made by the district. Each of the accounts was then classified according to the previously described chart of accounts. After the expenditures had been classified into and summed within the appropriate services, they were then annotated on Form I.

The third step in the collection of data was to obtain from each school within the district a copy of its master schedule for the 1969-70 school year. The school year--annual, trimester, semester, or quarter plan--determined the number of schedules needed from each school. Each master schedule was examined to see whether it contained the following data:

1. Name of class
2. Name of instructor
3. Hours of instruction per meeting
4. Official class enrollment as reported to the state
5. Number of weeks during which class was in session.

If any of the above data was not indicated on the master schedule, the missing information was obtained.

Once those data were gathered, the total annual aggregate contact hours of the district were calculated by multiplying the enrollments times the hours of instruction to obtain the number of contact hours per class. Those figures were then summed and multiplied by the appropriate number of weeks that classes were in session.

To obtain the annual aggregate contact hours for vocational programs, the same procedure was used. However, it was first necessary, by using the information provided in step one, to identify each approved vocational class on the master schedule.

Once both the district total annual aggregate contact hours and the vocational annual aggregate contact hours were ascertained, the difference between the two equaled the annual aggregate contact hours for other instructional programs in the district. The district total annual aggregate contact hours and the annual aggregate contact hours for all other programs were then annotated on Form I. The vocational contact hours by program were then annotated on Form III.

The fourth step was to identify the total 1969-70 direct cost for industrial arts and for each vocational program in the district. To obtain those data, the following expenditures for each program in each school in the district were determined:

1. Vocational Director's Salary
2. Vocational Consultants' or Supervisors' Salaries
3. Vocational Teachers' Salaries
4. Secretarial and Clerical Salaries for those directly assisting Vocational Directors, Supervisors, and Teachers.
5. Other Salaries for Instruction (e.g., vocational teaching aides)

6. Textbooks

7. Teaching Supplies

8. Replacement of Instructional Equipment

9. Other Expenses (including any expenditure that can be directly related to any vocational program offered by the school).

All of the above data were then indicated on Form III. However, to identify teachers' salaries by program, Form II with the following procedure was utilized. First, it was necessary to ascertain what unit of measure constituted a full-time teacher within the district. That varied between types of institutions. For example, in a secondary district, the unit might have been five teaching periods a day as compared to a post-secondary district where the unit might have been fifteen teaching units per week. Once that unit had been identified and annotated on Form I, then the percentage of time each individual spent teaching within every program was determined by dividing actual time spent by the full-time unit. That percentage was then multiplied times the appropriate fraction of the individual's actual annual salary to obtain the actual expenditure of a teacher's salary by program. (The fraction depended upon whether classes ran on the quarter, the trimester, the semester, or the annual plan.) In dealing with part-time personnel, it was necessary to determine the hours each individual worked for the program and then multiply those hours times the appropriate hourly wage. Teachers' salaries were then summed by program on Form II and annotated on Form III.

The fifth and final step was to determine the following miscellaneous data, which were placed on Forms I and III:

1. The average annual teacher's salary in the district.

2. The number of contact hours of a full-time student in other programs in the district.

3. The number of contact hours of a full-time vocational student in the district.

4. The total classroom square footage for industrial arts and other instructional programs in the district.

5. The total classroom square footage for each vocational program in the district.

Prior to departure from each district, each researcher had to check the list below to make certain all required data were obtained:

1. Were all the state-approved vocational courses in the district identified and placed in their proper program?

2. Were the 1969-70 district expenditures obtained?

3. From each school within the district was a 1969-70 master schedule for each quarter, trimester, semester, or year obtained?

4. On each master schedule, were the following data indicated?

   a. Name of class
   b. Name of instructor
   c. Hours of instruction per meeting
   d. Official class enrollment as reported to the state
   e. Number of days or weeks during which class was in session.

5. Were the direct costs for each vocational program in each school obtained?

6. Was the unit of measure for a full-time teacher in the district obtained?

7. Was the average annual teacher's salary in the district obtained?

8. Were the number of contact hours for a full-time student in other instructional programs in the district obtained?

9. Were the number of contact hours for a full-time vocational student in the district obtained?

10. Was the classroom square footage for other instructional programs obtained from each school?

11. Was the classroom square footage for each vocational program in each school obtained?

Two-man teams visited each district and, using the procedures described above, collected and recorded the necessary data. Teams spent approximately two days per district. District visitations were conducted between April and July, 1971. Between July and September, 1971, the investigator verified (by telephone conversation with district personnel) the data that had been collected by associates.

Statistical Procedures This subsection is divided into two areas: first, a description of how the program unit costs and cost ratios were determined; second, how the cost estimation formula was tested. Worksheet I (Appendix C) was developed to consolidate data from Forms I, II, and III so that unit costs and cost ratios might easily be determined. The direct cost of an instructional program or service was determined by summing the data annotated on Form III. The three indirect service costs were prorated to the various instructional services and programs by use of formulae (1) through (6). Those prorated indirect costs were then added to the direct costs to produce a total instructional service or program cost. That cost was then divided by the service's or program's ASCH to calculate the unit cost. Cost ratios were then determined by dividing the unit cost of other instructional programs into the industrial arts service's, vocational service's, and each vocational program's unit costs.

To test and analyze the cost estimation formula (8), the following procedures were used. First, it was necessary to determine a K value

for the vocational programs within each district. Worksheet II (Appendix C) was developed to show how that was accomplished. Once values for K were determined, separate high school and community college mean K's were calculated for each vocational program. Substitution of those K's and the appropriate district data into formula (8) produced an estimated program unit cost. Using that cost, the cost estimation accuracy of formula (8) was ascertained. That was accomplished by calculating the sum of the squared differences between a vocational program's actual cost and its mean cost per ASCH for each school. Similarly calculated was the sum of the squared differences between the actual cost and estimated cost per ASCH. Those sums were then compared. If the latter was less than the former, then formula (8) calculated a better estimate of the cost than the program or service mean cost. On the basis of the results of the above comparison, the formula (8) variable relationships were further analyzed. That was accomplished by examining the correlations among the formula variables computed by a statistical program within the Statistical Package for the Social Sciences (26).

Summary

This chapter described the development and application of the procedures used to determine and estimate vocational program unit costs. A budget chart of accounts was developed that reclassified accounts of traditional function-object budget structures. Four distinct levels were identified: Level I, District; Level II, General Service Grouping; Level III, Service Grouping; and Level IV, Program Grouping. Level II was subdivided into three general services: Direct Instruction; Indirect

Instruction; and Non-instruction, or costs not charged to instruction. Those general services provided the basic framework into which the traditional budget structure could then be classified. Classification of accounts into the new structure enabled an identification of the three indirect costs: Instructional Support; General Support; and Plant Operation and Maintenance. The preceding provided their easy proration by the variables: Annual Student Contact Hours; Number of Full-Time-Equivalent Teachers; and Classroom Square Footage. Once indirect costs had been properly prorated to programs and services, the total costs and unit costs could be calculated. Unit costs were determined by using the Annual Student Contact Hour as the base unit of measure. Unit costs of vocational programs, industrial arts, and other instructional programs in three high school districts and one community college district in each of seven states were thus determined.

Formula (8), a program cost-estimation formula, was then developed. That formula assumed that vocational program costs per student contact hour were equal to the average instructional cost per annual student contact hour times the ratio of the average class size for all services to the average class size of a vocational program, plus a program factor. Program unit costs determined by the aforementioned procedures were utilized to ascertain whether formula (8) accurately estimated costs.

CHAPTER IV

ANALYSIS OF DATA

The first section of this chapter presents and analyzes unit costs of instructional services and programs. The second section presents a test of the vocational cost estimation formula. The third section summarizes the findings identified by the data in the preceding two sections.

Analysis of Vocational Service and Program Instructional Costs

This section provides clear comparisons among the unit costs of instructional services and among the unit costs of instructional programs. Those comparisons result from application of the cost-determining procedures in Chapter III to data provided by the sampled districts. In addition, usage of the procedures provides a comparison of instructional costs in high schools with those in community colleges. The data tables presented herein are summaries of tables (Appendices D & E) that carefully identify how, in each district, instructional costs and cost ratios were determined.

Classification of District Expenditure Objects Sampled high school and community college districts in this study reported their current expenditures in the traditional function-object manner. To make the analysis required by this study necessitated reclassification of the expenditure objects into the General Service and Service Groupings described in the program accounting structure in Chapter III. Table IV-1

TABLE IV-1

SUMMARY OF CURRENT EXPENDITURES FOR SELECTED HIGH SCHOOL AND COMMUNITY COLLEGE DISTRICTS, FY 1969-70

Expenditure Grouping	High Schools		Community Colleges	
	Amount	%	Amount	%
Total Direct Instruction	52,518,416	60	11,267,355	56
O.I.P.*	39,837,736	45	7,673,685	38
I.A.*	3,131,406	4	None	None
Voc.*	9,549,274	11	3,594,270	18
Total Indirect Instruction	27,468,845	31	6,988,023	35
Instructional Support	3,183,312	4	881,539	4
General Support	13,803,291	15	4,026,780	21
Plant Operation & Maint.	10,482,242	12	1,979,704	10
Total Non-Instructional	7,810,120	9	1,850,122	9
Student Services	7,558,843	9	1,059,622	5
Community Services	251,277	0	790,500	4
TOTAL	87,797,381	100	20,105,500	100

*O.I.P. -- Other Instructional Programs
I.A. -- Industrial Arts Service
Voc. -- Vocational Education Service

Source: Derived from district data.

illustrates the total district reclassification of those objects into that account structure.

In both high school and community college districts the General Service Direct Instructional Costs comprise the largest portion of the total current expenditures (60% in high schools, 56% in community colleges). In descending order within the districts are the percentages for Indirect Instructional Costs and for Non-Instructional Costs. Examination of Table IV-1 reveals that high schools and community colleges spent the same percentage of current expenditures for Non-Instructional Costs and for Instructional Support Costs. Differences, however, existed in service percentages for Instruction, General Support, and Plant Operation and Maintenance. The major percentage cost difference was between General Support Costs in high school districts and in community college districts. The 6 percent greater cost in community colleges for General Support can be attributed primarily to the salaries paid the additional administrative staff. For example, in high school districts, a specific high school may be fortunate to have as administrative personnel, besides the superintendent staff, a principal, two vice-principals and a registrar. However, besides the superintendent staff of a community college district, few colleges are without a president, several deans of instruction, and a dean of admissions, as well as individuals in charge of college business and personnel affairs.

Classification of the district total current expenditures into the three broad General Service Groupings and eight Service Groupings provides two major benefits. First, as previously stated in Chapter III, it enables the public to assess more clearly the value of the instructional and non-instructional services that schools are providing.

Second, the account structure provides a basic framework for classifying indirect instructional costs so that they can be more accurately prorated to the cost of instructional services and programs.

Proration of Indirect Cost Determination of the total cost of an instructional service and program requires an appropriate allocation of indirect instructional costs. Three indirect service costs are identified in Chapter III: Instructional Support, General Support, and Plant Operation and Maintenance. Allocation of those costs proportionately to the burdens created by each instructional service and program requires ratios comprised of the following variables: Annual Student Contact Hours, Number of Full-Time-Equivalent Teachers, and Classroom Square Footage. Table IV-2 illustrates the mean ratios for prorating the indirect service costs to the vocational instructional service in the sampled high schools and community colleges. Despite the large deviations about those means, some consistencies are noted among the values of the table. First, the highest mean ratio for both sampled high schools and sampled community colleges is vocational classroom square footage to total classroom square footage. That ratio indicates that the classroom square footage for the average vocational course tends to be larger than the average classroom square footage for all courses. Second, the lowest mean ratio for both sampled high schools and sampled community colleges is vocational annual student contact hours to total annual student contact hours. Third, the mean ratio of number of vocational full-time-equivalent teachers to number of total full-time-equivalent teachers is consistently larger than the ASCH ratio for both sampled high schools and sampled community colleges. The

TABLE IV-2

PRORATION PERCENTAGES FOR INDIRECT INSTRUCTIONAL SERVICE COSTS, FY 1969-70

Criterion	High Schools*		Community Colleges	
	Mean	Std. Dev.	Mean	Std.Dev.
Voc. Service's ASCH** to All Services' ASCH	13.6	4.4	28.8	10.8
Voc. Service's FTET** to All Services' FTET	17.5	6.2	36.9	9.5
Voc. Service's CSF** to All Services' CSF	26.2	11.3	47.1	13.5

*Data for district 3E are not included in the calculation of these figures. The school within district 3E is primarily a vocational high school and is not comparable to the comprehensive high schools in the other districts.

**ASCH -- Annual Student Contact Hours
FTET -- Number of Full-Time-Equivalent Teachers
CSF -- Classroom Square Footage

Source: Derived from district data.

relationship of the preceding two ratios indicates that vocational class sizes are smaller than class sizes for all instructional services. Fourth, both sampled high schools and sampled community colleges provide sufficient differences among the three ratios (CSF, FTET, and ASCH) to justify the separate proration of each indirect service cost. The table clearly indicates that proration of all indirect costs solely by either enrollment or contact hours achieves a reduced cost allocation not proportional to the burden created by the vocational instructional service and programs. Finally, the reader may note that the mean ratios for the sampled community colleges are approximately twice those for the sampled high schools. The disparity indicates that the vocational service offered within the sampled community college districts is generally far more extensive than that offered in the sampled high school districts.

Once proration criteria for an instructional service are established, their application to the appropriate district indirect cost makes possible identification of indirect costs of a service. Adding those costs to the direct cost of the instructional service provides the total cost of the instructional service.

Total Vocational Service Cost Table IV-3 details both the direct and the indirect expenditures that together comprise the total cost of vocational instructional services within the sampled high school and community college districts. Examination of Table IV-3 reveals that in both high schools and community colleges direct expenditures make up the larger portion of the total service cost. The largest direct expenditure is teachers' salaries, which represent 54.3 percent of the total service cost in high schools and 42.4 percent in community colleges. Instructional supply costs are comparable at the two levels, comprising

TABLE IV-3

TOTAL INSTRUCTIONAL SERVICE COSTS FOR
VOCATIONAL EDUCATION, FY 1969-70

Expenditures	High Schools		Community Colleges	
	Amount	%	Amount	%
Total Direct	9,549,274	65.9	3,594,270	59.9
1. Dir. Sal.	241,057	1.7	159,211	2.6
2. Supv. Sal.	403,848	2.8	87,569	1.5
3. Tchr. Sal.	7,864,945	54.3	2,545,651	42.4
4. Sec. Sal.	146,670	1.0	67,113	1.2
5. Other Sal.	49,020	.3	13,416	.2
6. Textbk.	104,982	.7	629	0
7. Supplies	460,909	3.2	207,532	3.5
8. Rep. Equip.	135,671	.9	184,871	3.1
9. Rent. Equip.	18,233	.1	66,073	1.1
10. Maint. Equip.	11,730	.1	233,184	3.9
11. Travel	85,441	.6	14,885	.2
12. Contr. Serv.	17,165	.1	14,136	.2
13. Other	9,603	.1	0	0
Total Indirect	4,942,068	34.1	2,414,365	40.1
1. I.S.*	375,835	2.6	213,227	3.5
2. G.S.*	2,170,431	15.0	1,401,788	23.3
3. P.O.M.*	2,395,802	16.5	799,350	13.3
TOTAL	14,491,342	100.0	6,008,635	100.0

*I.S. -- Instructional Support
G.S. -- General Support
P.O.M. -- Plant Operation and Maintenance

Source: Derived from district data.

3.2 percent of the total vocational service cost in high schools and 3.5 percent in community colleges. In most instances, other direct expenditures are even smaller percentages of the total service cost. However, the reader may note that within community colleges, total expenditure for replacement, rental, and maintenance of instructional equipment accounts for approximately 8 percent of the total cost. Comparison of the preceding percentages to their respective percentages in high school districts reveals that during 1969-70 the sampled community college districts were spending a greater amount than were the sampled high school districts for vocational equipment replacement, rental and upkeep. Those data suggest a possible need for increased emphasis on vocational equipment replacement and upkeep in high school districts. In addition, the larger community college equipment expenditures explain, to a large extent, the lower percentage of the community college total vocational service cost attributable to teachers' salaries.

Examination of indirect costs of vocational services in the high schools and community colleges produces three findings. First, General Support Costs and Plant Operation and Maintenance comprise nearly all of the indirect costs. Second, those indirect costs, with the exception of the direct costs for teachers' salaries, comprise the largest percentages of the total cost of vocational services. Third, General Support Costs constitute a larger percentage of the total vocational service expenditure in community colleges than in high schools. This finding is commensurate with the higher general administrative expenditures in community colleges.

After the identification and analysis of the total cost of an instructional service and program, their unit costs must be determined to

enable comparisons among services and among programs. Prior to analyzing the unit costs, it is first necessary to examine the base unit of measurement used to determine those costs.

Base Unit of Measurement The Annual Student Contact Hour, as previously stated, is the base unit of measurement used in this study. This unit not only permits meaningful comparisons of unit costs, but also serves as a good measure of the amount of instruction provided in a service and program. Table IV-4 illustrates the aggregates of the annual student contact hours for instructional services and vocational programs in the sampled high school districts and in the sampled community college districts. On the basis of student contact hours, community college districts devote twice as much of their total programs to vocational instruction as do high school districts. That finding is compatible with data in Table IV-2. Further examination of Table IV-4 reveals that within the sampled high school districts the vocational programs providing greatest amounts of instructional service are Office, Trade and Industry, and Home Economics. In the sampled community college districts the vocational programs providing greatest amounts of instructional service are Office, Technical, Trade and Industry, and Health.

Unit Costs As previously described in Chapter III, instructional service and program unit costs are determined by dividing their total costs by their annual student contact hours. Table IV-5 illustrates the mean instructional service and program unit costs for the sampled high school and community college districts. Examination of the table reveals that in the sampled high school and community college districts the current mean unit cost of vocational education is higher than the current mean unit cost of other instructional programs. In addition,

TABLE IV-4

ANNUAL STUDENT CONTACT HOURS FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, FY 1969-70

Instructional Services & Programs	High Schools		Community Colleges	
	Number	%	Number	%
All Services	109,635,061	100.0	11,663,109	100.0
1. O.I.P.*	91,473,602	83.4	8,874,092	76.1
2. I.A.*	5,475,599	5.1	None	None
3. Voc.*	12,685,860	11.5	2,789,017	23.9
a. AG.*	741,215	5.9	35,896	1.3
b. D.E.*	1,081,283	8.5	249,323	9.0
c. OFF.*	4,202,839	33.1	812,568	29.1
d. HLTH.*	152,078	1.2	423,416	15.2
e. H.E.*	3,169,011	24.9	97,196	3.5
f. TECH.*	50,076	.4	613,195	21.9
g. T & I*	3,289,358	26.0	557,423	20.0
Total Voc.	12,685,860	100.0	2,789,017	100.0

*O.I.P. -- Other Instructional Programs
I.A. -- Industrial Arts Service
Voc. -- Vocational Education Service
AG. -- Agricultural Programs
D.E. -- Distributive Education
OFF. -- Office
HLTH. -- Health
H.E. -- Home Economics
TECH. -- Technical
T & I -- Trade & Industry

Source: Derived from district data.

TABLE IV-5

MEAN COST PER ANNUAL STUDENT CONTACT HOUR FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, FY 1969-70

Instructional Services & Programs	High Schools		Community Colleges	
	Mean	Std.Dev.	Mean	Std.Dev.
All Services ($\bar{C}$)	.80 (23)*	.22	1.63 (7)*	.26
1. O.I.P.**	.74 (23)	.21	1.49 (7)	.38
2. I.A.**	1.05 (21)	.41	N/A (0)	N/A
3. Voc.**	1.08 (23)	.30	2.21 (7)	.19
a. AG.**	1.69 (18)	.60	2.22 (3)	.60
b. D.E.**	.92 (23)	.40	2.03 (4)	.85
c. OFF.**	1.01 (23)	.52	2.02 (7)	.31
d. HLTH.**	2.26 (8)	2.16	2.40 (5)	.85
e. H.E.**	1.18 (22)	.64	2.13 (5)	.15
f. TECH.**	2.18 (2)	1.08	1.97 (6)	.49
g. T & I**	1.67 (23)	1.62	2.71 (6)	.90

*Number of sampled districts offering instructional service or program.

**See Table IV-4.

Source: Derived from district data.

the mean unit cost of industrial arts, offered only in the high school districts, is also higher than the mean unit cost of other instructional programs.

Examination of the vocational program mean unit costs reveals that in both high school and community college districts all vocational programs are more expensive than other instructional programs. The following lists rank the vocational programs in both high school and community college districts from their highest cost to their lowest cost:

High School	Community College
1. Health	1. Trade and Industry
2. Technical	2. Health
3. Agriculture	3. Agriculture
4. Trade and Industry	4. Home Economics
5. Home Economics	5. Distributive
6. Office	6. Office
7. Distributive	7. Technical

Comparison of the above rankings reveals considerable variation in program placement. For example, in high school districts Technical programs incur the second highest unit cost, whereas in community college districts they are the lowest unit cost program. Trade and Industry programs in the high school districts rank fourth in cost, but in the community college districts they rank first.

Analysis of Table IV-5 reveals that the community college mean instructional service costs are twice the high school mean costs. This finding for other instructional programs can be explained primarily by differences in teachers' and administrators' pay scales and lower student-faculty ratios. (The mean average teacher's salary is $9,171 in the sampled high school districts, and $10,786 in the sampled community college districts. As Table IV-7 reveals, the mean class size in the sampled high school districts is 19 percent higher than in the sampled

community college districts.) The mean cost difference between the high school vocational service and the community college vocational service is also 100 percent. An additional important factor is emphasis upon high-cost programs in community college districts. Table IV-4 reveals that in high school districts, vocational programs in Office, Trade and Industry, and Home Economics are the major student contact programs. Those high school vocational programs, however, rank sixth, fourth, and fifth, respectively, according to program unit costs. In community college districts, the major vocational student contact programs are Office, Technical, Trade and Industry, and Health. Those programs rank sixth, seventh, first, and second, respectively, in community college unit costs. The preceding data indicate that in high school districts the lower-cost vocational programs are dominant. However, in community college districts the dominant vocational programs are divided between the higher- and the lower-cost programs, producing a higher mean cost.

Finally, the differences within programs produce extensive variations in program unit costs among districts. For example, one district may offer a Technical program made up of comparatively low-cost courses in radio and television repair. However, another district may offer a Technical program made up of high-cost courses in computer and missile systems repair. The extensive deviations in costs within programs suggest the possible ineffectiveness of mean program weighting factors in vocational cost distribution formulae.

Cost Ratios Chapter I shows that federal vocational monies are to be allocated by states to local districts to meet the difference in

TABLE IV-6

MEAN COST RATIOS BETWEEN INDICATED INSTRUCTIONAL SERVICES & PROGRAMS AND O.I.P., FY 1969-70

Instructional Services & Programs	High Schools			Community Colleges		
	Mean		Std. Dev.	Mean		Std. Dev.
1. O.I.P.**	1.00		....	1.00		....
2. I.A.**	1.47	(23)*	.42	None	(0)*	None
3. Voc.**	1.54	(23)	.46	1.57	(7)	.41
a. AG.**	2.67	(18)	1.43	1.65	(3)	.40
b. D.E.**	1.30	(23)	.61	1.51	(4)	.46
c. OFF.**	1.42	(23)	.66	1.63	(7)	.67
d. HLTH.**	3.10	(8)	2.98	1.93	(5)	.75
e. H.E.**	1.73	(22)	1.28	1.44	(5)	.25
f. TECH.**	2.91	(2)	1.29	1.68	(6)	.82
g. T & I**	2.39	(23)	2.15	2.00	(6)	.75

*Number of sampled districts offering instructional service or program.

**See Table IV-4.

Source: Derived from district data.

costs between vocational programs and other instructional programs. One facet of this study is to develop procedures to assist state and local educational administrators in determining accurate current cost differences. Those procedures have previously been described. Their application resulted in program unit costs identified in Table IV-5. Table IV-6 illustrates the mean cost ratios or cost differentials between the unit costs of vocational programs and those of other instructional programs. Examination of the table reveals that high school and community college total vocational service cost ratios are quite similar (1.54 in high schools, 1.57 in community colleges). Those data suggest that if the federal funds are used only to support the "excess" cost of vocational education, then the same excess cost ratio may be used for high schools and community colleges.

Further examination of Table IV-6 reveals the range of vocational program costs in high schools to be wider than in community colleges (1.30-3.10 in high schools, 1.44-2.00 in community colleges). In addition, the table reveals that industrial arts has almost the same cost ratio as vocational programs (IA, 1.47; V, 1.54). Those data suggest the possible need for providing categorical support for industrial arts instruction.

Finally, the table reveals that the deviations from the mean cost ratios are large. Those data substantiate the finding, suggested by the deviations in program unit costs, that usage of the cost ratio mean as a weighting in a funds allocation formula would create an inappropriate distribution of vocational funds to local districts.

Analysis of the Vocational Cost-Estimation Formula

The purpose of the development of a vocational cost-estimation formula is to provide state and local educational administrators with a simple tool to estimate and control appropriations and allocations of vocational costs. The formula developed in this study is described in Chapter III. This section, on the basis of the unit costs identified in the previous section, presents an analysis of that formula.

Variables In Tables IV-5 and IV-7 the mean values of the formula variables are illustrated. The variable $\overline{C}$ is identified in Table IV-5 as the unit cost for All Services. The variables $\overline{N}$, represented by All Services class size, and N, represented by the respective vocational program class size, are identified in Table IV-7. Examination of that table reveals the mean class size for vocational instruction to be smaller than that of other instructional programs and that of all services in both high school and community college districts. Further, the table reveals that community college vocational class sizes are smaller than high school vocational class sizes. In addition, the table reveals industrial arts class sizes to be slightly smaller than the mean class size for the high school vocational service.

The following lists rank the vocational programs in both high school and community college districts from those with the largest class size to those with the smallest class size.

High School	Community College
1. Distributive	1. Distributive
2. Office	2. Office
3. Home Economics	3. Agriculture
4. Trade & Industry	4. Home Economics
5. Health	5. Health
6. Technical	6. Technical
7. Agriculture	7. Trade & Industry

TABLE IV-7

MEAN CLASS SIZE FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, FY 1969-70

Instructional Services & Programs	High Schools		Community Colleges	
	Mean	Std. Dev.	Mean	Std.Dev.
All Serivces ($\bar{N}$)	24.5	3.2	20.9	3.9
1. O.I.P.*	26.3	2.9	22.1	4.8
2. I.A.*	20.3	3.2	None	None
3. Voc.*	21.0	3.0	19.3	3.0
a. AG.* (N)	15.3	4.2	18.7	5.1
b. D.E.* (N)	22.9	7.4	23.7	10.3
c. OFF.* (N)	22.6	3.5	22.2	4.3
d. HLTH.* (N)	20.0	6.9	17.6	.8
e. H.E.* (N)	20.4	3.2	18.5	8.4
f. TECH.* (N)	16.9	3.2	16.3	4.5
g. T & I* (N)	20.3	3.2	16.2	4.6

*See Table IV-4.

Source: Derived from district data.

Despite smaller class sizes in the community college districts, the rankings of the programs are quite similar.

Examination of the deviations from the class size means reveals them to be generally small. Exceptions to the preceding are the deviations in Distributive programs in both high schools and community colleges, Health programs in high schools, and Home Economics programs in community colleges.

K Factor Chapter III describes the K Factor and how it is derived. Table IV-8 illustrates the mean K's applied in formula (8) to estimate the vocational program costs. In the construction of formula (8) the researcher assumed that there would be only small deviations from the mean K's. Examination of Table IV-8 reveals deviations larger than the program means in both high school and community college districts. Those data suggest the inappropriateness of establishing constant vocational program factors, other than class size, for costs. Cost variations within programs are too great.

Testing Formula (8) Table IV-9 makes comparisons in each of nine instructional categories: industrial arts service; vocational service; and seven vocational programs. In each instructional category, it compares (1) the sum of the squared difference between actual cost and mean cost per ASCH with (2) the sum of the squared difference between actual cost and estimated cost per ASCH. This table reveals that the program cost estimated by the program mean cost, for the sum of the squared differences between the actual cost and the mean cost is smaller than the sum of the squared differences between the actual cost and the estimated cost. Examination of Table IV-9 reveals that formula (8), with but a few exceptions, is totally ineffective. Exceptions to the preceding are

TABLE IV-8

MEAN K FACTOR FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, FY 1969-70

Instructional Services & Programs	High Schools		Community Colleges	
	Mean	Std. Dev.	Mean	Std. Dev.
1. I.A.*	.09	.30	None	None
2. Voc.*	.22	.38	.31	.33
a. AG.*	.70	1.11	.37	.30
b. D.E.*	.02	.53	.36	.43
c. OFF.*	.20	.56	.30	.24
d. HLTH.*	1.35	2.66	.21	.49
e. H.E.*	.37	1.14	.11	.39
f. TECH.*	.79	.93	-.18	.42
g. T & I*	.62	1.71	.44	.56

*See Table IV-4.

Source: Derived from district data and formula (8).

TABLE IV-9

COMPARISON OF THE SUM OF THE SQUARED DIFFERENCES BETWEEN ACTUAL COST AND MEAN COST PER ASCH AND ACTUAL COST AND ESTIMATED COST PER ASCH FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, FY 1969-70

Instructional Services and Programs	High Schools		Community Colleges	
	$\sum$ (Actual Cost - Mean Cost)^2	$\sum$ (Actual Cost - Mean Cost Estimated)^2	$\sum$ (Actual Cost - Mean Cost)^2	$\sum$ (Actual Cost - Mean Cost Estimated)^2
1. I.A.*	34,344	15,068	None	None
2. Voc.*	19,961	22,342	2,129	21,319
a. AG.*	60,939	92,191	7,201	5,656
b. D.E.*	34,750	35,032	21,689	15,778
c. OFF.*	60,312	54,408	3,748	10,470
d. HLTH.*	326,287	470,461	29,172	33,088
e. H.E.*	88,010	101,540	940	16,969
f. TECH.*	11,705	12,850	12,087	26,682
g. T & I*	574,870	575,018	40,945	47,285

*See Table IV-4.

Source: Derived from district data.

industrial arts service and vocational Office programs in high schools, and vocational Agriculture and Distributive programs in community colleges. In those programs, formula (8) did calculate a slightly better estimate of the actual cost than did the program mean cost.

However, the general ineffectiveness of formula (8) leads to an analysis of the variable relationships that the formula assumed true:

> First, one must assume that the cost of a vocational program within a district is directly related to the cost to the district of other instructional programs. The validity of that assumption depends upon highly positive correlation coefficients between the two program costs. Table IV-10 shows the correlation coefficients between those variables. Examination of the table reveals, with but a few exceptions, the extremely low correlation between the variables. Those data suggest that rather than a strong direct relationship existing between the cost variables, no relationship exists at all.
>
> The second necessary assumption is that a strong relationship exists between the cost of an instructional program and its class size. That relationship could be illustrated by highly negative correlations between a program's cost and its class size. Table IV-11 illustrates those correlation coefficients, which reveal that in community college Agriculture, Distributive, and Trade and Industry programs the correlations are highly negative. However, in general the correlations

TABLE IV-10

CORRELATION BETWEEN COST PER ASCH FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS AND COST PER ASCH FOR ALL SERVICES AND O.I.P., FY 1969-70

Instructional Services & Programs	High Schools		Community Colleges	
	All Services	O.I.P.	All Services	O.I.P.
1. I.A.*	.724	.565	None	None
2. Voc.*	.468	.261	-.433	.119
a. AG.*	-.001	-.109	.921	.696
b. D.E.*	.329	.282	-.405	.560
c. OFF.*	.269	.176	.562	.273
d. HLTH.*	.102	-.046	-.614	-.292
e. H.E.*	.084	.012	-.252	-.008
f. TECH.*	----	----	-.013	-.286
g. T & I*	.188	.029	-.426	.108

*See Table IV-4.

Source: Derived from district data using a statistical program from (SPSS).

TABLE IV-11

CORRELATION BETWEEN COST PER ASCH AND CLASS SIZE FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, FY 1969-70

Instructional Services and Programs	High Schools			Community Colleges		
	Services	O.I.P.	Programs	Services	O.I.P.	Programs
All Services	-.317	-.522		-.056	-.119	
1. O.I.P.*	-.277	-.454		-.452	-.498	
2. I.A.*	.008	-.328		None	None	
a. AG.*			-.316			-.913
b. D.E.*			-.661			-.830
c. OFF.*			-.271			-.393
d. HLTH.*			.617			-.247
e. H.E.*			-.232			-.656
f. TECH.*			----			.659
g. T & I*			.267			-.789

*See Table IV-4.

Source: Derived from district data using a statistical program from (SPSS).

between cost and class size in high schools and community colleges are not highly negative. Those data suggest that rather than a strong inverse relationship existing between the variables, little or no relationship exists.

Data in Tables IV-10 and IV-11 suggest the reason for formula (8)'s ineffectiveness. It is interesting to note, however, that in community college Agriculture and Distributive programs, where the variable relationships held true, formula (8) did calculate a better estimate of the program cost than did the program mean cost.

Findings

This section summarizes the data presented in the preceding two sections.

1. District Current Expenditures
   a. In both the sampled high school and the sampled community college districts, Direct Instructional Costs comprise the largest portion of the total current expense. Indirect Instructional Costs and Non-Instructional Costs comprise the remainder of the total district current expenditures.
   b. Non-Instructional (9%) and Instructional Support (4%) cost percentages of the total current expenditures are the same in both the sampled high school and the sampled community college districts.
   c. General Support Costs in the sampled community college districts are a larger percentage of the

total current expenditures than in the sampled high school districts.

2. Indirect Cost Proration Criteria

   a. In both sampled high school and sampled community college districts the highest percentage proration criterion is the ratio of vocational classroom square footage to total classroom square footage.

   b. In both sampled high school and sampled community college districts the lowest percentage proration criterion is the ratio of vocational annual student contact hours to total annual student contact hours.

   c. Located between the preceding proration percentages is the percentage of vocational number of full-time-equivalent teachers to total number of full-time-equivalent teachers.

3. Components of Total Vocational Service Cost

   a. Teachers' salaries comprise the largest percentage of total cost of a vocational service. That percentage is followed by the Indirect cost percentages for General Support and Plant Operation and Maintenance.

b. In the sampled community colleges larger percentages of total vocational cost are spent for instructional equipment replacement, rental, and maintenance than in the sampled high schools.

4. Annual Student Contact Hours (Base Unit)

   a. In the sampled high school districts the vocational programs in which the greatest amount of instructional service occurred are Office, Trade and Industry, and Home Economics.

   b. In the sampled community college districts the vocational programs in which the greatest amount of instructional service occurred are Office, Technical, Trade and Industry, and Health.

   c. On the basis of student contact hours, sampled community college districts devote twice as much of their total program to vocational instruction as do high schools.

5. Unit Costs

   a. Vocational Service current costs are higher than costs of Other Instructional Programs in both sampled high school and sampled community college districts.

   b. Industrial Arts Service current costs are higher than costs of Other Instructional Programs and slightly lower than costs of total vocational service in the sampled high school districts.

   c. Ranked below from highest unit cost to lowest unit

cost are the vocational programs in both the sampled high school and the sampled community college districts.

High School	Community College
1. Health ($2.26)	1. Trade & Industry ($2.71)
2. Technical ($2.18)	2. Health ($2.40)
3. Agriculture ($1.69)	3. Agriculture ($2.22)
4. Trade & Industry ($1.67)	4. Home Economics ($2.13)
5. Home Economics ($1.18)	5. Distributive ($2.03)
6. Office ($1.01)	6. Office ($2.02)
7. Distributive ($.92)	7. Technical ($1.97)

d. Community college mean other instructional program and mean vocational unit costs are twice the high school mean other instructional program and mean vocational unit costs.

e. There are large deviations from vocational program mean costs.

6. Cost Ratios

a. Cost ratios of the total vocational service in sampled high school districts are quite similar to those in sampled community college districts. (1.54 in high schools, 1.57 in community colleges.)

b. In high schools, cost ratios of industrial arts service are similar to cost ratios of vocational services.

c. In both high schools and community colleges, deviations from the mean cost ratios are large.

7. Vocational Cost-Estimation Formula

a. In both the sampled high school and the sampled community college districts, vocational class sizes are smaller than those of other instructional programs.

b. Sampled community college vocational class sizes are smaller than sampled high school vocational class sizes.

c. In the sampled districts, deviations from the mean program K factor are larger than the means themselves.

d. In the sampled districts the sum of the squared differences between the vocational program actual cost and mean cost is generally smaller than the sum of the squared differences between the vocational program actual cost and estimated cost.

e. In the sampled districts there is little direct relationship between the cost of a vocational program and the cost of other instructional programs.

f. In the sampled districts there is little inverse relationship between the cost of a vocational program and its average class size.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Introduction Recent years have seen increased recognition of the importance of vocational education to the welfare of the United States. Educators, economists, sociologists, and politicians have all expressed the need for America's youth to receive vocational education. However, despite widespread acknowledgment of the need, American education is still predominantly occupied with the 20 percent of this country's youth who complete a college education.

One obstacle to initiation and expansion of vocational education in the public schools has been the contention that it is more costly than other instructional programs. Aware of this problem, Congress, in the 1968 Vocational Education Amendments, established the difference in cost between vocational programs and other instructional programs as one of the criteria that states must use to distribute federal vocational funds. To comply with that federal allocation criterion, states and local agencies needed to identify the cost difference. To accomplish that task necessitated the determination of accurate vocational program total costs and unit costs.

Need Seven recent studies directed toward determining the cost of vocational programs were analyzed. Four areas of concern were identified.

First, each reviewed study utilized a budget account structure that included as part of the cost of instruction the accounts for student services, for auxiliary services (transportation, food, health), and

for community services. Inclusion of those service costs raised two concerns:

1. The practice prohibited the public from clearly assessing the cost and value of those additional non-instructional services that their educational institutions were providing.
2. Reported costs of the instructional programs were inflated.

Second, most of the researchers in the reviewed studies allocated indirect costs on one of the following bases: student enrollment, student contact hour of instruction, or student credit hour of instruction. Exceptions to those were two studies in which, additionally, a square footage factor was utilized to prorate the indirect cost of plant operation and maintenance. Since most researchers used only one proration procedure, concern was expressed about whether they could distribute all indirect costs proportionately among the various instructional programs. Guidelines suggested by Badger (3:68) and by the United States Office of Education (38) indicated the need for utilizing more than one method of proration.

Third, three researchers within the examined studies utilized the clock hour or contact hour as their base unit of cost comparison. However, three other researchers chose the credit hour as their base unit of measure. Usage of this latter base unit, with its problems as identified by Stevens and Elliott (32:77), caused concern about the precision of the determined program costs.

Fourth, only one study (6) could be found that attempted to develop

a cost-estimation formula utilizing various components. Testing of that model found that it produced course cost differences of up to 21 percent from those produced by the detailed cost analysis procedure.

As a result of the concerns within the preceding areas, the subsequent conclusions were drawn:

1. Procedures used for determining the cost of instructional programs were inadequate.
2. Additional research was needed in the development of an instructional program cost-estimation formula.

Purpose The purpose of this study is to determine vocational program costs at both the high school and the community college levels for categorical fund support. On the basis of the preceding conclusions, that purpose necessitated the accomplishment of three objectives. First, current costs of vocational programs had to be identified. That objective required the development of a program accounting procedure that, in turn, entailed identifying:

1. a chart of accounts;
2. procedures for prorating indirect costs.

Second, once costs of programs were determined, appropriate program unit costs could be established, serving as a basis for meaningful cost comparisons. Development of such a basis was the second objective. Finally, a formula was created and tested, utilizing unit costs determined from the above to estimate and control, for purposes of allocation, the cost of vocational programs--the third objective.

Procedures Chapter III of this study describes in detail the procedures developed to achieve each of the above objectives. A budget

chart of accounts was constructed that reclassified accounts of the traditional function-object budget structures. In Figure 2, four distinct levels were identified: Level I, District; Level II, General Service Grouping; Level III, Service Grouping; and Level IV, Program Grouping. Level II was subdivided into three general services: Direct Instruction, Indirect Instruction; and Non-instruction, or costs not charged to instruction. Those general services provided the basic framework into which the traditional budget structure could then be classified. Classification of accounts into the new structure provided an identification of the three indirect costs: Instructional Support; General Support; and Plant Operation and Maintenance. The preceding structure facilitated proration of those costs by the variables: Annual Student Contact Hours; Number of Full-Time-Equivalent Teachers; and Classroom Square Footage. Once indirect costs had been properly prorated to programs and services, the total costs and unit costs could be calculated. Unit costs, for purposes of cost comparisons, were determined by using the Annual Student Contact Hour as the base unit of measurement.

Finally, a program cost-estimation formula was developed. That formula assumed that vocational program costs per student contact hour were equal to the average instructional cost per annual student contact hour times the ratio of the average class size for all services to the average class size of a vocational program, plus a program factor.

Data Collection

Analysis of vocational program costs, utilizing the aforementioned procedures, required selection of a large sample of school districts.

The investigator decided that, given limitations of time and money, three high school districts and one community college district from each of seven states would provide the most representative sample. States that participated were chosen from the sample of fifteen states surveyed in the 1970 study by Lindman (24).

Collection of data needed for this study necessitated the development of data-collection instruments and the training of individuals in their use. Instruments used in this study are in Appendix B. Fellow researchers were trained in the collection procedures and sent in two-man teams to each district to collect and record the necessary data. Among the important data items collected were: (1) direct expenditures of vocational programs; (2) total district expenditure; (3) master class schedule for each school in the district; (4) floor area of classrooms used for instruction by the different services and programs within the district; and (5) the number of full-time-equivalent teachers for services and programs in the district. Data collected were limited to the fiscal year 1969-70. That period was chosen because it was the most recent in which the required data were totally accessible.

Statistical Procedures Program unit costs determined by the previously mentioned procedures were utilized to ascertain whether the cost-estimation formula accurately estimated costs. That it did not was determined by first calculating the sum of squared differences between vocational program's actual cost and its mean cost per ASCH for each ,ool. Similarly calculated was the sum of the squared differences between the actual cost and estimated cost per ASCH. Those sums were then compared. If the latter was less than the former, then

the estimation formula produced a better estimated of the cost than did the program or service mean cost. On the basis of the results of the above comparison, the formula variable relationships were further analyzed. The analysis was accomplished by examining the correlations among the formula variables computed by a statistical program within the Statistical Package for the Social Sciences (26).

Findings To conclude this summary, the major findings revealed by the gathered data are identified.

1. In Table IV-3, teachers' salaries comprise the largest percentage of total cost of a vocational service. That percentage is followed by the indirect cost percentages for General Support and for Plant Operation and Maintenance. In addition, the table reveals that in the sampled community colleges larger percentages of total vocational cost are spent for instructional equipment replacement, rental, and maintenance than in the sampled high schools.

2. In Table IV-4, on the basis of student contact hours, sampled community college districts devote twice as much of their total program to vocational instruction as do the sampled high school districts.

3. In Table IV-5, vocational service current unit costs are higher than unit costs of other instructional programs in both sampled high school and sampled community college districts. In addition, industrial

arts service current unit costs are higher than costs of total vocational service in the sampled high school districts. The table further reveals that community college mean other instructional program and mean vocational unit costs are twice the high school mean other instructional program and mean vocational unit costs. Finally, there are large deviations about the mean vocational program costs.

4. In Table IV-6, cost ratios of the total vocational service in sampled high school districts are quite similar to those in sampled community college districts. (1.54 in high schools, 1.57 in community colleges.) In addition, the table reveals that in high schools the mean cost ratio of industrial arts service is similar to cost ratios of vocational services. Finally, in both sampled high school and sampled community college districts, deviations from the mean cost ratios are large.

5. In Table IV-8, deviations from the mean program K factor are larger than the means themselves.

6. In Table IV-9, the sum of the squared differences between the vocational program actual cost and mean cost is generally smaller than the sum of the squared differences between the vocational program actual cost and estimated cost.

7. In Table IV-10, little direct relationship exists between the cost of a vocational program and the cost of other instructional programs.

8. In Table IV-11, little inverse relationship exists between the cost of a vocational program and its average class size.

Conclusions

Chapter I of this study noted that states must consider the difference in a local district's costs between vocational programs and those of other instructional programs in their allocation of federal vocational funds. To comply with that federal allocation criterion necessitated that states and local educational agencies determine accurate vocational program unit costs. Procedures developed in this study were conceived to assist state and local administrators in the accomplishment of that task.

The sample of districts in which those procedures were applied to gather vocational program cost data was not random. As a result, findings cannot statistically be generalized to all high school and community college districts. However, the size of the sample and its representative nature suggest the potential for general applicability.

Conclusions drawn from the findings in the sampled districts are as follows:

First, appropriate proration of indirect costs for General Support and for Plant Operation and Maintenance is critical in determining the precise total cost of an instructional service. Distribution of those costs in

proportion to the burdens that the instructional services create requires a combination of proration ratios. However, if, for simplicity of proration, a single ratio were required, the findings suggest that an instructional service's number of full-time-equivalent teachers to total number of full-time-equivalent teachers be selected as the single best approximation of the indirect cost calculated by the combined ratios.

Second, high school districts place less emphasis on instructional equipment replacement and maintenance for vocational education than do community college districts. The findings do not indicate in either high school or community college districts the extent of such programs. However, the findings do indicate that, as a percentage of the total vocational service cost, community college districts' replacement and maintenance of instructional equipment expenditures were seven times those of high school districts.

Effective equipment replacement programs are mandated by rapid changes in equipment technology. Obsolete equipment can greatly reduce the effectiveness of the training received in vocational programs.

Third, current unit cost differences between vocational programs and other instructional programs suggest, on the basis of cost only, the continuation of vocational categorical support. The findings reveal that in both high school and community college districts all vocational programs cost more than other instructional programs.

Fourth, the finding that high school mean vocational service costs are half community college mean vocational service costs should not lead to the conclusion that high schools have more effective vocational programs than community colleges. This study examined only the costs of programs. The effectiveness of a program is dependent upon several additional factors. For example:

1. whether completion of the program actually provided the student with a saleable skill;
2. whether completion of the program reduced the individual's job-search time;
3. whether completion of the program provided the individual with additional earning power;
4. whether the program meets the vocational desires of students.

Each of the above must also be evaluated along with cost prior to drawing any conclusion about the actual effectiveness of the community college vocational programs.

Fifth, the data findings suggest that strong consideration be given to additional financing for industrial arts service. Industrial arts courses provide exploratory vocational experiences that greatly assist an individual in the choice of an occupation, and also the training appropriate to that choice. In many of the sampled high school districts, the differences between a vocational course and an industrial arts course were: (1) the qualifications of the instructor, (2) depth of

inquiry inherent in the course, and (3) length of time that students spent in the course. Similarities between the two services were (1) facilities, (2) class size, and (3) identified unit costs. With the preceding as suggested evidence, it would seem appropriate that as the concept of career education takes form, both vocational education and industrial arts service should be parts of that concept.

Sixth, the findings revealed the ineffectiveness of the suggested vocational cost-estimation formula. Potential failure of the formula was indicated by finding such great cost fluctuation within each vocational program. That cost fluctuation made it impossible to establish a specific program constant. In addition, the finding that no direct relationship existed between a vocational program's cost and all instructional services' cost invalidated a basic assumption of the formula. The combination of those factors led to the imprecision of the formula.

Finally, the above two findings also suggest that vocational program weighting factors are neither sufficiently sensitive to local needs nor precise enough to be used in a state vocational fund's allocation system. Such factors, however, can still be used for determining gross cost estimates for purposes of establishing general appropriation levels.

Recommendations

On the basis of the preceding conclusions, the following recommendations are made to administrators of vocational education and to the legislative representatives of the people.

1. Adaptation of the program accounting structure used in this study should be considered by state and local educational administrators. Such a structure enables the public to assess more precisely the actual cost and value of the services that schools are providing.

2. Specific federal guidelines should be established for prorating indirect costs among instructional programs. Without such guidelines states will continue to use widely varying procedures, greatly hindering compilation of accurate national totals of vocational program costs.

3. State vocational administrators should thoroughly examine vocational instructional equipment replacement and maintenance policies within their states. Specific attention should be directed toward replacement policies at the high school level. Separate financing of instructional equipment replacement within state and federal vocational categorical support should be considered.

4. State vocational administrators should conduct cost-effectiveness studies that compare high school and community college vocational programs. Costs alone do not indicate the effectiveness of vocational programs. However, if an educational institution can provide vocational programs at a lower cost, without sacrificing

attainment of skill, then continued financial support of similar programs at a higher cost must be re-evaluated.

5. State and federal legislators should strongly consider increasing vocational current categorical support to include the current cost of industrial arts service. This study suggests that, in many instances, costs of industrial arts service are similar to those of vocational programs. Industrial arts also serves as an initiator of an individual's interest toward a specific vocational field. It would seem appropriate that within the funding of career education and/or vocational education, industrial arts should be included.

6. State vocational administrators should consider a three-component system for estimating and controlling vocational program costs. The study revealed the ineffectiveness of the tested formula and usage of vocational program weighting factors. Neither was sufficiently sensitive to local needs nor sufficiently precise in estimating local vocational program costs. However, the study did identify three major current cost areas of vocational programs:

    a. certificated salaries
    b. indirect costs
    c. replacement of instructional equipment and unique supplies in support of that equipment

On the basis of the preceding, a three-component system that is sensitive to local district needs, yet provides cost controls for the state, is suggested. The components of such a cost-estimation system are described below.

The first component is certificated salaries. For each vocational program, a district would report:

a. Number of Program Teaching Positions

b. Number of Program Supervisory Positions (prorated on time spent)

c. Annual Salary Requirements for indicated number of positions, based upon an approved salary schedule.

d. Average Daily Attendance in program classes.

To determine the actual program salary cost would require the state to ascertain an appropriate percentage figure for estimating the cost of sick leave and other fringe benefits. Multiplying that figure times the program salary requirement and then adding the result to that requirement would provide a district program salary estimate. Control of that estimate could be achieved by the state's determining approved class size levels for each vocational program. Division of the reported program average daily attendance by the reported program number of teaching positions determines the district program class size. Comparison of the state and district class sizes would determine whether the state would provide financing for the number of program teaching positions requested by the district.

The second component is for support of indirect costs. Those costs vary greatly from district to district. To control excessive program

overhead, it is suggested that the state determine a support figure. Calculation of such a figure for high schools or community colleges could require:

a. State Total Current Expenditures
b. State Total Expenditures for Pupil Services
c. State Total Expenditures for Community Services
d. State Total Expenditures for Salaries of Teachers and Supervisors
e. Total Number of Teachers

Subtraction of the expenditures for Pupil Services, Community Services, and Salaries of Teachers and Supervisors from the Total Current Expenditures identifies the state total indirect cost. This study revealed that the best single variable to use in distributing indirect costs to programs is the number of full-time-equivalent teachers. On the basis of that information, division of the state total indirect cost by the total number of teachers would provide the best program support unit. A district program support cost could then be calculated by multiplying the state unit times the number of program-approved teachers and supervisors.

The third component is the instructional equipment replacement and supply cost. To determine that cost would require districts to identify types of equipment and supplies and their costs. To provide some basis of control for such requests would probably require states to develop program equipment replacement schedules.

Addition of the three program components produces an estimate of the total cost of a vocational program within a district. Accountability

is maintained by the control mechanisms incorporated into each component. A suggested application of the system is described by Figure 3.

Recommendation for Further Study

This study examined costs of vocational education for only a one-year period. That limitation could potentially have affected the cost findings and the effectiveness of the cost-estimation formula. As a result, it is recommended that a longitudinal study of this type be conducted to determine whether findings of that study are compatible with those of the current study.

Figure 3

District Vocational Program Budget Request

School District:_____ Program:_____

School Year:_____

		Actual Current Year		Estimated Ensuing Year
I.	Salary Component			
	A. Number of Program Teaching Positions	_____	A	_____
	B. Number of Program Supervisory Positions (prorated by time spent)	_____	B	_____
	C. Total Program Positions (A+B)	_____	C	_____
	D. Annual Salary Requirements for Indicated Number of Positions Based upon Approved Salary Schedule	_____	D	_____
	E. Estimated Amount Required to Finance Sick Leave and Other Approved Fringe Benefits (D x approved state percentage figure)	_____	E	_____
	F. Total Salary Component (D+E)	_____	F	_____
	G. Program Average Daily Attendance	_____	G	_____
	H. Student-Faculty Ratio (F/A)	_____	H	_____
II.	Support Component			
	Number of Approved Program Positions x State Support Component	_____		_____
III.	Equipment Replacement and Supply Component			
	A. Equipment			
	Nomenclature			
	1. _____	$_____		$_____
	2. _____	$_____		$_____
	B. Supplies			
	Nomenclature			
	1. _____	$_____		$_____
	2. _____	$_____		$_____
	C. Total	$_____		$_____
IV.	Total Program Component (IF+II+IIIC)	$_____		$_____

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APPENDIX A

PARTICIPATING STATES AND SCHOOL DISTRICTS

PARTICIPATING SCHOOL DISTRICTS

California	Foothill Junior College District
	San Jose Unified School District
	Kern Joint Union School District
	San Diego Unified School District
Florida	South Florida Junior College
	Manatee County School Board
	Sarasota County School Board
	Hardee County School Board
Michigan	Kellogg Community College
	Coldwater Community Schools
	Kalamazoo Public Schools
	Niles Community Schools
	Benton Harbor Public Schools
Ohio	Four County Vocational Institute
	Bedford City Schools
	Toledo City Schools
	Findlay City Schools
	Four County Vocational High School
Texas	Central Texas College
	Goose Creek School District
	Lamar School District
	Northeast Houston School District

Utah	Dixie Junior College
	Davis School District
	Jordan School District
	Nebo School District
Washington	Shoreline Community College
	Edmonds School District
	Puyallup School District
	South Kitsap School District

APPENDIX B

DATA COLLECTION INSTRUMENTS

FINANCING VOCATIONAL EDUCATION

DISTRICT LEVEL INFORMATION

DATA COLLECTION FORM I

State:_____ Name of District:_____

Prepared by:_____ Date:_____

Note: This form applies to either secondary or post-secondary district data. Please check appropriate box: SECONDARY (10-12) [ ]

POST-SECONDARY (13-14) [ ]

Classified District Budget Expenditures

I. Instructional Programs _____

II. Instructional Support _____

III. Pupil Services _____

IV. General Support _____

V. Plant Operation and Maintenance _____

VI. Community Services _____

Miscellaneous District Information

I. District's average annual teacher's salary. _____

II. The number of contact hours of a full-time student in other programs in the district. _____

III. The number of contact hours of a full-time vocational student in the district. _____

IV. The unit of measure which constitutes a full-time teacher in the district. _____

V. The number of weeks for which classes were in session. _____

VI. District total annual aggregate contact hours. _____

VII. Annual aggregate contact hours for all other programs in the district. _____

a. Total Vocational contact hours = _____

b. Total Industrial Arts " " = _____

FINANCING VOCATIONAL EDUCATION

VOCATIONAL TEACHER INFORMATION

DATA COLLECTION FORM II

State: _____ School District: _____ Instructional Period: Year [ ] Semester [ ] Quarter [ ]

Instructor's Name	Total Annual Salary	Ag.		D.E.		Off.		Hlth.		H.E.		Tech.		T & I		Total V.E.		I.A.		O.I.P.	
		I/C*	A/S**	I/C*	A/S**	I/C*	A/S**	I/C*	A/S**	I/C*	A/S**	I/C*	A/S**	I/C*	A/S**	I/C*	A/S**	I/C*	A/S**	I/C*	A/S**

* I/C = % Instructional Contact

**A/S = Actual Salary

FINANCING VOCATIONAL EDUCATION

VOCATIONAL PROGRAM INFORMATION

DATA COLLECTION FORM III

State:_____ School District:_____ School:_____

I. V.E. Occupational Direct Cost	Ag.	D.E.	Off.	Hlth.	H.E.	Tech.	T & I	Total V.E.	I.A.	O.I.P.
1. Voc. Dir. Sal.										
2. Voc. Super. Sal.										
3. Voc. Tchrs.'Sal.										
4. Voc. Sec. Sal.										
5. Other Sal.										
6. Textbooks										
7. Supplies										
8. Rep. Equip.										
9. Other Expenses:										
a.										
b.										
c.										
II. No. of Student Contact Hours										
III. No. FTE Teachers										
IV. Avg. Class Size										
V. Instruc. Sq.Ft.										

APPENDIX C

VOCATIONAL WORKSHEETS

WORKSHEET I

VOCATIONAL PROGRAM COST WORKSHEET

School District:_____ State:_____

High School:_____ Community College:_____ Year:_____

Data Identification	Instructional Programs & Services									
	Ag.	D.E.	Off.	Hlth.	H.E.	Tech.	T&I	I.A.	Total V.E.	O.I.P.
I. Direct Cost										
II. Instruct. Support										
A. Stu. Contact Hours										
B. Instruct. Sup. %										
C. Instruct. Sup. Cost										
III. General Support										
A. FTE Teachers										
B. Gen. Sup. %										
C. Gen. Sup. Cost										
IV. Oper. & Maintenance										
A. Square Footage										
B. Oper. & Maint. %										
C. Oper. & Maint. Cost										
V. Indirect Cost (II+III+IV)										
VI. Total Cost (I+V)										
VII. Cost/Stu.Cont.Hr.(V/IIA)										
VIII. Cost Ratios										
IX. % Indirect/Direct Cost										

WORKSHEET II

K FACTOR WORKSHEET

School District _____ State _____

High School _____ J.C. _____ Year _____

1. District average cost per student ($\bar{C}$) _____

2. District average student-faculty ratio ($\bar{N}$) _____

VOCATIONAL PROGRAMS	Vc	N	$\frac{\bar{N}}{N}$	K
Agriculture				
Distributive				
Office				
Health				
Home Economics				
Technical				
Trade & Industry				
Industrial Arts				

$$K = \frac{Vc}{\bar{C}} - \frac{\bar{N}}{N}$$

APPENDIX D

HIGH SCHOOL DISTRICT COST DATA AND COST RATIOS

TABLE ABBREVIATIONS

O.I.P.	--	Other Instructional Programs
I.A.	--	Industrial Arts Service
T.O.C.	--	Total Vocational Service
AG.	--	Agricultural Programs
D.E.	--	Distributive Programs
OFF.	--	Office Programs
HLTH.	--	Health Programs
H.E.	--	Home Economics Programs
TECH.	--	Technical Programs
T & I	--	Trade & Industry Programs

TABLE D-1

DIRECT CURRENT EXPENDITURES FOR COURSES IN AGRICULTURE,
BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	Voc. Dir. Exp.	Supv. Sal.	Tchr. Sal.	Other Sal.	Sec. Sal.	Textbk. Exp.	Supplies Exp.	Replace. Equip. Exp.	Travel Exp.	Equip. Rent Exp.	Contr. Serv. Exp.	Maint. Equip. Exp.	Other Exp.
1A													
1C	792		15,993		181	59	418		122			102	
1D		1,141	14,159		279		269		87				
2A	2,981	11,651	103,054		2,610		2,045	2,045					
2C	332		12,896		151		540		2,385				
2D	860		12,288			284	216	600	1,000				
3B													
3C	117	617	9,883	67	146	1,454	3,234		33				19
3D													
3E	832	12,200	30,355		2,359	1,137	3,822	618	493				
4B	1,022		51,289		294	522	5,951	3,033	1,487				
4C	526		15,348		31	406	547	562	729				
4D	3,676		50,308		141	588	3,793		3,418				
5A			21,932				241	280	1,340				
5C	965		20,662		209		444	242	3,575				
5D	515		10,620		155		1,387		2,101				
6B													
6C													
6E	203		4,360		80	165	80	43	15	27		33	
6I	332		14,125		28	32	68	21	547			25	
7B	1,350	7,200	66,058	3,900	300	1,389	1,389		6,355			525	
7C	2,500		87,473		1,062	433	3,054		5,016				
7D	456	924	15,828		290	38	3,726						263

TABLE D-2

DIRECT CURRENT EXPENDITURES FOR COURSES IN DISTRIBUTION,
BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	Voc. Dir. Exp.	Supv. Sal.	Tchr. Sal.	Other Sal.	Sec. Sal.	Textbk. Exp.	Supplies Exp.	Replace. Equip. Exp.	Travel Exp.	Equip. Rent Exp.	Contr. Serv. Exp.	Maint. Equip. Exp.	Other Exp.
1B		7,716	21,734			342	506		1,194			158	
1C	1,437	536	15,737		328	35	17	583	221			185	
1D		1,697	11,481		415		85		87				
2B	3,015	11,784	46,462		2,640	548	1,380	1,380					
2C	3,562	7,680	66,178		1,626	141	650		3,215				
2D	981		7,230			13	8	275	300		650		
3B	2,699	894	6,880		252		780	671	432				
3C	899	6,977	44,798	512	1,117	127	4,107		248				132
3D	1,600		18,456		291	1,387	302	1,415	82				
3E	227		7,585		644	310	1,042	169	135				
4B	238		5,627		68	122	29	430	80				
4C	392		13,232		23	303	838	419	593				
4D	997		11,975		39	160	1,246		667				
5B			21,813			244	364		768				
5C	1,383		8,000		300	163	644		381				
5D	491		17,720		148	80	547		732				
6C	3,074		12,465		648	527	1,429	156	41				
6D	977		11,813		375	105	905	105	128				
6E	1,963		13,897		775	395	771	415	148	264		321	
6F	2,330		21,611		121	138	297	93	13			141	
7B	500	2,436	26,296		771	572	572		1,018				
7C	766		2,901		258	152	94		267				
7D	436	3,026	25,852		290	126	3,125	2,334					263

TABLE D-3

DIRECT CURRENT EXPENDITURES FOR COURSES IN OFFICE,
BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	Voc. Dir. Exp.	Supv. Sal.	Tchr. Sal.	Other Sal.	Sec. Sal.	Textbk. Exp.	Supplies Exp.	Replace. Equip. Exp.	Travel Exp.	Equip. Rent Exp.	Contr. Serv. Exp.	Maint. Equip. Exp.	Other Exp.
1B		12,264	130,523		18,955	1,500	8,837	4,300	626	5,254		7,018	
1C	8,945	2,042	89,295		2,040	4,554	7,408	3,483	1,376			1,248	
1D		4,755	34,580		1,160	593	596		289		1,800		
2B	3,591	14,034	71,260		3,144		1,980						
2C	4,209		40,667		1,921	4,951	1,590	186	815		2,417		
2D	1,626		10,100			203					650		
3B	3,142	5,475	73,926		293		1,892	2,443	731				
3C	1,667	9,474	439,537	948	2,074	236	7,395		459				246
3D	3,498		42,319		636	3,033	661	6,000	150				
3E	2,815		67,699		7,979	3,845	12,924	2,090	1,668				
4B	5,867		203,404		1,686	2,909	20,224	3,026	790				
4C	2,777		90,496		163	2,143	138	2,967	21				
4D	2,460		32,430		95	394	656	10,000	744				
5B			7,430								3,785		
5C	1,235		12,314		268	77	925		474				
5D	4,935		32,381		1,482	262	1,755		1,202				
6C	1,964		7,117		414	337	912	99	104				
6D	3,683		41,429		1,414	395	3,412	397	128				
6E	1,857		25,700		733	485	729	393	140	250		303	
6F	2,200		28,600		114	130	281	87	12	30		105	
7B	750	6,311	276,109		120		15,290		77				
7C	9,192		246,981		3,833	1,522	14,127		1,005				
7D	2,635	8,963	513,674		1,741	1,188	21,511	11,344					1,584

TABLE D-4

DIRECT CURRENT EXPENDITURES FOR COURSES IN HEALTH,
BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	Voc. Dir. Exp.	Supv. Sal.	Tchr. Sal.	Other Sal.	Sec. Sal.	Textbk. Exp.	Supplies Exp.	Replace. Equip. Exp.	Travel Exp.	Equip. Rent Exp.	Contr. Serv. Exp.	Maint. Equip. Exp.	Other Exp.
1B													
1C													
1D		307	3,150		80		29						
2B													
2C	541		79,444		247	191							
2D													
3B													
3C													
3D													
3E	711		25,500		2,016	972	3,266	528	422				
4B													
4C													
4D	712		2,160		28	114	38		350				
5B													
5C													
5D	252		7,380		76	132	432		509				
6C	930		6,600		196	159	432	47	55				
6D													
6E													
6F													
7B	300	5,080	20,585	3,420	120	507	2,087		377				
7C													
7D	1,327	2,771	29,139		870	93	8,097	67					7[illegible]

TABLE D-5

DIRECT CURRENT EXPENDITURES FOR COURSES IN HOME ECONOMICS,
BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	Voc. Dir. Exp.	Supv. Sal.	Tchr. Sal.	Other Sal.	Sec. Sal.	Textbk. Exp.	Supplies Exp.	Replace. Equip. Exp.	Travel Exp.	Equip. Rent Exp.	Contr. Serv. Exp.	Maint. Equip. Exp.	Other Exp.
1B		15,110	117,025			5,077	15,466	10,082	2,467	2,766		483	
1C	2,419	2,002	29,998		552	1,851	3,837		372			711	
1D		5,223	28,962		1,278	435	955	150	261				
2B	2,693	10,526	64,072		2,358	3,442	3,265	3,265					
2C	3,545	6,012	47,676		1,619	1,139	2,204	698	1,901				
2D	130		1,220				106		338				
3B													
3C	3,201	4,959	185,653	1,251	2,738	312	20,840		606				521
3D	1,573		21,960		286	1,363	297	1,327	172				
3E	1,286	9,922	28,088		3,646	1,757	5,906	954	763				
4B	4,089		109,362		1,175	2,090	7,416	2,142	360				
4C	3,176		24,106		186	2,452	498	3,396	103				
4D	3,638		38,548		140	582	2,119		1,675				
5B			31,545				724		381				
5C	1,362		22,846		412		1,266	1,081	1,074				
5D	1,498		37,380		450		1,092		929				
6C	2,910		16,208		613	499	1,352	147	129				
6D	2,947		46,284		1,131	316	2,730	318					
6F	1,547		18,667		611	283	608	327	117	208		253	
6G	2,331		24,080		119	136	294	91	12			110	
7B	500	8,965	336,012		60	7,904		250					
7C	1,153		259,037	4,329	389	1,331	25,146		126				
7D	1,327	7,407	397,672		870	553	6,609						985

TABLE D-6

DIRECT CURRENT EXPENDITURES FOR COURSES IN TECHNICAL,
BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	Voc. Dir. Exp.	Supv. Sal.	Tchr. Sal.	Other Sal.	Sec. Sal.	Textbk. Exp.	Supplies Exp.	Replace. Equip. Exp.	Travel Exp.	Equip. Rent Exp.	Contr. Serv. Exp.	Maint. Equip. Exp.	Other Exp.
1B													
1C													
1D													
2B													
2C	716		18,444		327	163	700		644				
2D													
3B													
3C													
3D													
3E													
4B													
4C													
4D													
5B													
5C													
5D													
6C													
6D													
6E													
6F													
7B	500	2,975	23,381	2,093	300		5,717						
7C													
7D													

TABLE D-7

DIRECT CURRENT EXPENDITURES FOR COURSES IN TRADE & INDUSTRY,
BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	Voc. Dir. Exp.	Supv. Sal.	Tchr. Sal.	Other Sal.	Sec. Sal.	Textbk. Exp.	Supplies Exp.	Replace. Equip. Exp.	Travel Exp.	Equip. Rent Exp.	Contr. Serv. Exp.	Maint. Equip. Exp.	Other Exp.
1B			5,774				1,142						
1C	1,070		11,230		244		333		165			137	
1D		1,507	18,673		369	19	1,785		147				
2B	6,352	36,725	133,560		5,562		8,380						
2C	4,588	11,948	96,842	7,232	2,081	1,247	3,020		2,121				
2D	883		6,600			107	1,784						
3B	9,410	3,000	35,031		879	235	3,003	6,143	1,260				
3C	4,611	25,317	607,406	2,619	5,735	1,573	32,083		1,268				2,241
3D	5,138		111,585		934	4,455	971	3,629	519				
3E	9,261	35,407	229,751		26,254	12,650	42,524	6,875	5,490				
4B	2,786		104,010		801	1,424	11,275	14,271	242				
4C	973		36,717		57	751	1,085	1,040	477				
4D	1,463		35,127		57	234	3,818	1,000	1,442				
5B		6,473	20,374			461	2,890	482	880		7,865		
5C	5,373		43,470		1,164	140	388		1,440				
5D	4,289		86,790		1,289	568	3,351	1,148	2,357				
6C	6,118		60,816		1,289	1,048	2,844	310	301	9,069			
6D	2,518		29,781		967	270	2,333	271	128				
6E	2,710		45,687		1,070	264	1,065	574	205	365		442	
6F	1,294		16,986		67	77	165	51				62	
7B	7,500	50,899	349,902	22,649	3,300	3,331	27,820		920				
7C	612		17,694		207	35	782		1,877				
7D	2,635	11,816	166,621		1,741	896	15,914	12,303					2,750

TABLE D-8

DIRECT CURRENT EXPENDITURES FOR COURSES IN INDUSTRIAL ARTS,
BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	Voc. Dir. Exp.	Supv. Sal.	Tchr. Sal.	Other Sal.	Sec. Sal.	Textbk. Exp.	Supplies Exp.	Replace. Equip. Exp.	Travel Exp.	Equip. Rent Exp.	Contr. Serv. Exp.	Maint. Equip. Exp.	Other Exp.
1B		13,910	324,612			832	24,858	11,730	859			4,300	
1C			70,758				3,193						
1D			40,888			25	4,187						
2B			52,908				774	773					
2C			38,396			151	1,875						
2D													
3B	1,605	4,546	55,931		374		2,421	2,421	240				
3C	3,530	13,443	301,888	2,007	4,390	500	36,650		971			197	520
3D	1,749		15,741		318	1,516	330						
3E													
4B			47,780			1,246	25,564						
4C			56,227			1,990	10,311						
4D			21,546			323	8,111						
5B		6,471	27,886				1,410	710					
5C	1,494		10,726		324		711		30				
5D			21,625										
6C			22,830			150	882	150					
6D	7,007		109,960		2,689	751	6,492	755					
6E	2,390		36,568		943	376	939	506	181	322		350	
6F	5,725		54,012		297	339	731	227	31			273	
7B		7,200	299,950	2,250		6,591	6,592	1,966			850	5,000	
7C			629,820			3,497	76,623	143					
7D		20,021	654,355		5,559	8,414	150,727						

TABLE D-9

TOTAL DIRECT CURRENT EXPENDITURES FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1B	2,479,611	386,101	392,311		31,644	185,277		168,474		6,916
1C	1,157,328	73,951	181,656	17,667	19,079	90,389		41,342		13,179
1D	475,392	45,100	136,723	15,935	13,765	43,773	3,546	37,204		22,500
2B	1,447,996	54,545	565,804	124,386	67,209	94,009		89,621		190,279
2C	1,941,744	40,422	451,402	16,304	83,052	56,756	80,423	64,794	20,994	129,079
2D	302,158		48,452	15,248	9,457	12,579		1,794		9,374
3B	554,483	67,628	161,471		14,608	87,902				53,961
3C	4,393,755	64,006	1,438,260	15,570	58,917	462,036		218,584		682,883
3D	769,094	19,654	234,039		23,533	56,297		26,978		127,231
3E	57,650		614,895	51,816	10,110	99,020	33,415	52,322		368,212
4B	1,774,836	74,599	569,631	63,598	6,594	237,996		126,634		134,809
4C	1,436,380	68,528	207,671	18,149	15,800	98,705		33,917		41,100
4D	521,563	29,980	217,479	61,924	15,084	46,779	3,849	46,702		43,141
5B	918,201	36,480	130,290	23,793	23,189	11,235		32,650		39,423
5C	312,657	13,285	132,809	26,095	10,871	15,293		28,575		81,075
5D	1,618,846	21,625	232,412	20,778	19,718	42,017	8,758	41,349		99,792
6C	708,423	24,012	141,357		16,340	10,947	8,417	21,858		81,795
6D	1,996,336	127,654	155,260		14,408	50,858		53,726		30,298
6E	615,241	42,615	129,637	5,035	18,949	30,650		22,631		32,382
6F	711,227	61,083	117,294	15,176	24,714	31,559		27,143		18,702
7B	3,307,428	330,309	1,304,642	86,166	32,167	298,657	32,676	353,689	32,966	466,321
7C	5,625,026	710,083	693,253	99,437	4,438	276,660		291,511		21,207
7D	6,715,061	839,106	1,292,526	21,505	35,452	562,340	43,130	415,423		214,676

TABLE D-10

ANNUAL NUMBER OF STUDENT CONTACT HOURS FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
3B	4,011,108	321,720	483,312		27,000	233,996		217,276		5,010
3C	1,638,180	115,920	265,680	14,220	25,920	162,150		43,920		19,440
3D	1,196,463	131,940	186,657	14,580	21,735	60,480	3,960	66,690		19,212
5B	2,891,826	55,656	787,122	138,870	60,120	166,986		125,658		285,489
5C	3,832,373	64,980	590,587	11,167	120,600	142,200	18,360	119,700	24,300	161,260
5D	517,320		73,980	14,220	16,200	26,820		2,160		11,520
6B	939,136	97,336	177,376		31,280	36,616				101,480
6C	10,683,380	696,710	1,873,310	22,015	178,340	330,040		432,900		910,015
6D	1,676,760	38,092	257,032		34,868	76,184		33,098		111,962
6E	119,205		760,095	41,895	11,115	141,075	35,910	64,980		606,120
6F	5,618,160	372,750	920,340	67,140	15,840	385,200		368,560		183,600
7B	3,758,220	342,900	570,420	38,340	28,800	201,780		230,760		90,740
7C	1,879,560	81,720	444,420	126,360	34,200	81,600	24,480	126,720		50,040
7D	2,654,010	95,580	286,290	11,160	18,540	116,550		12,870		127,170
8B	858,900	28,175	204,050	18,200	25,900	23,100		35,875		103,975
8C	1,765,400	41,650	452,550	19,250	18,550	186,550	9,450	56,525		162,225
8D	678,132	30,940	206,934		42,406	27,118		40,222		54,448
8E	3,018,060	181,440	261,900		25,200	95,220	12,740	76,320		65,160
8F	1,227,960	64,440	223,920	5,400	53,100	50,220		41,940		73,260
8G	1,508,220	122,760	185,580	11,520	50,040	47,160		49,320		37,510
9B	5,845,634	337,952	1,084,024	78,939	104,178	543,802	8,592	241,535	25,776	78,491
9C	12,215,368	799,216	793,936	98,912	34,848	347,776		304,304		8,096
9D	22,942,227	1,450,692	1,596,345	9,027	102,483	717,186	38,586	575,956		153,105

TABLE D-11

PERCENTAGE OF STUDENT CONTACT HOURS FOR INDICATED INSTRUCTIONAL SERVICES & PROGRAMS, BY HIGH SCHOOL DISTRICT, FOR 1969-70. (THE SUM OF COLUMNS 1, 2, & 3 EQUALS 100%; THE SUM OF COLUMNS 4-10 EQUALS 100%)

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1B	86.3	6.7	10.9		5.6	48.4		45.0		1.0
1C	81.1	5.7	13.2	5.4	9.8	61.0		16.5		7.3
1D	77.0	8.7	12.3	7.8	11.7	32.4	2.1	35.7		10.3
2B	77.9	1.0	21.1	17.7	7.6	21.2		16.0		37.5
2C	85.4	1.4	13.2	1.9	20.4	24.1	3.7	20.3	4.1	25.1
2D	87.5		12.5	19.2	21.9	36.3		2.9		19.7
3B	77.4	8.0	14.6		17.6	20.7				61.7
3C	80.6	5.3	14.1	1.2	9.5	17.6		23.1		48.6
3D	85.1	1.9	13.0		13.6	29.6		13.2		43.6
3E	13.6		86.4	5.5	1.5	18.5	4.7	8.6		61.2
4B	81.3	5.4	13.3	7.3	1.7	41.9		29.2		19.9
4C	80.5	7.3	12.2	6.7	5.0	35.4		40.5		12.4
4D	78.1	5.4	16.5	28.4	7.7	19.0	5.5	28.1		11.3
5B	87.5	3.1	9.4	3.9	6.5	40.7		4.5		44.4
5C	78.7	2.6	18.7	8.9	12.7	11.3		17.6		49.5
5D	78.2	1.8	20.0	4.3	4.1	41.2	2.1	12.5		35.8
6C	74.0	3.4	22.6		20.5	13.1	6.2	19.4		40.8
6D	87.2	5.2	7.6		9.6	36.4		29.1		24.9
6E	80.9	4.3	14.8	2.4	23.7	22.4		18.7		32.8
6F	83.0	6.8	10.2	6.2	27.0	25.4		26.6		14.8
7B	83.4	1.7	14.9	7.3	9.6	50.2	.8	22.5	2.4	7.2
7C	88.3	5.8	5.8	12.5	4.4	43.8		38.3		1.0
7D	85.3	5.8	6.1	.6	6.4	44.9	2.4	36.1		9.6

TABLE D-12

INDIRECT INSTRUCTIONAL SUPPORT COSTS PRORATED BY PERCENTAGE OF STUDENT CONTACT HOURS TO INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1B	477,847	38,434	57,365		3,212	27,765		25,814		574
1C	72,916	5,125	11,868	641	1,163	7,240		1,958		866
1D	49,391	5,439	7,690	600	500	2,492	161	2,745		792
2B	129,828	1,667	35,165	6,224	2,673	7,455		5,626		15,187
2C	197,335	3,235	30,502	579	6,222	7,351	946	6,192	1,251	7,961
2D	24,375		3,482	668	763	1,264		101		686
3B	65,370	6,757	12,331		2,170	2,553				7,608
3C	140,265	9,223	24,538	294	2,331	4,319		5,668		11,926
3D	35,994	804	5,499		748	1,627		726		2,398
3E	3,694		23,465	1,291	352	4,341	1,103	2,018		14,300
4B	51,247	3,404	8,384	612	143	3,513		2,418		1,668
4C	136,176	12,349	20,638	1,383	1,032	7,306		8,358		2,553
4D	28,177	1,227	6,674	1,696	514	1,268	367	1,875		754
5B	29,079	1,030	3,124	122	203	1,271		141		1,387
5C	25,119	831	5,976	532	759	675		1,052		2,958
5D	36,513	840	9,338	402	383	3,847	196	1,167		3,343
6C	18,410	846	5,623		1,153	737	349	1,091		2,293
6D	109,650	6,539	9,557		917	3,479		2,781		2,380
6E	28,586	1,519	5,230	126	1,240	1,172		978		1,714
6F	34,263	2,807	4,211	261	1,137	1,070		1,120		623
7B	133,918	7,829	24,818	1,812	2,382	12,458	199	5,584	506	1,787
7C	473,552	31,070	31,070	3,884	1,367	13,608		11,900		311
7D	423,941	26,666	29,287	176	1,874	13,150	703	10,572		2,812

TABLE D-13

FULL-TIME-EQUIVALENT TEACHERS FOR INDICATED INSTRUCTIONAL SERVICES & PROGRAMS, BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1B	152.4	23.6	26.8		1.8	14.0		10.8		.2
1C	75.5	7.1	12.1	1.1	1.2	6.6		2.0		1.2
1D	42.2	4.2	10.3	1.0	1.0	3.3	.3	3.6		1.7
2B	117.0	4.0	50.6	10.2	5.0	8.4		8.0		16.0
2C	132.3	3.2	42.7	1.7	7.0	5.0	9.0	6.0	2.0	12.0
2D	24.2		4.4	.8	1.0	1.4		.2		2.0
3B	40.5	5.3	7.7		1.1	1.9				1.7
3C	579.0	30.7	93.4	3.3	6.0	13.8		18.7		51.6
3D	69.4	1.6	15.8		1.6	4.2		2.0		8.0
3E	8.0		48.0	3.0	1.0	9.0	3.0	4.0		20.0
3B	244.4	20.0	48.6	4.8	.8	16.2		13.2		13.6
4C	122.8	14.2	22.1	1.7	1.3	7.0		8.8		3.7
4D	56.2	4.2	22.2	7.2	1.2	3.6	1.2	5.8		3.2
5B	94.2	5.2	21.0	1.8	2.0	4.2		2.0		11.0
5C	74.8	2.0	13.6	1.4	1.0	3.8		2.4		5.0
5D	81.0	3.0	32.0	2.0	2.0	7.0	1.0	6.0		14.0
6C	28.0	1.8	10.8		1.2	1.2	.8	2.0		5.5
6D	129.4	11.2	13.0		1.2	4.0		3.8		1.0
6E	46.8	3.4	11.4	.4	1.6	2.4		2.2		4.5
6F	60.0	6.0	8.8	.6	1.8	2.0		2.6		1.8
7B	231.6	17.0	84.2	7.0	2.3	22.4	2.0	31.0	2.0	7.5
7C	456.3	51.7	67.0	7.6	.4	30.4		20.4		5.2
7D	1023.8	55.4	107.8	1.0	6.9	36.6	3.0	34.3		26.0

TABLE D-14

PERCENTAGE OF FULL-TIME-EQUIVALENT TEACHERS FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, BY HIGH SCHOOL DISTRICT, FOR 1969-70. (THE SUM OF COLUMNS 1,2, & 3 EQUALS 100%; THE SUM OF COLUMNS 4-10 EQUALS 100%)

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1B	78.4	10.1	11.5		6.7	52.2		40.3		.8
1C	79.7	7.5	12.8	9.1	9.9	54.3		16.8		9.9
1D	74.4	7.4	18.2	9.7	9.7	32.1	2.9	29.1		16.5
2B	66.2	2.3	29.5	20.2	9.9	16.6		15.8		37.5
2C	74.2	1.6	24.0	4.0	16.4	11.7	21.1	14.0	4.7	28.1
2D	84.6		15.4	18.2	22.7	31.8		4.6		22.7
3B	75.6	9.9	14.5		14.8	24.1				61.1
3C	82.3	4.4	13.3	3.5	6.4	14.8		20.0		55.3
3D	80.0	1.8	18.2		10.1	26.6		12.7		50.6
3E	14.3		85.7	6.3	2.1	18.8	6.3	8.3		58.2
4B	78.1	6.4	15.5	9.9	1.6	33.3		27.2		28.0
4C	77.2	8.9	13.9	7.7	5.9	31.7		39.8		14.9
4D	68.0	5.1	26.9	32.5	5.4	16.2	5.4	26.1		14.4
5B	78.3	4.3	17.4	8.6	9.5	20.0		9.5		52.4
5C	82.8	2.2	15.0	10.3	7.4	27.9		17.6		36.8
5E	69.8	2.6	27.6	6.2	6.2	21.9	3.1	18.8		13.8
6C	69.0	4.4	26.6		11.1	11.1	7.4	18.5		51.9
6D	84.2	7.3	8.5		9.2	30.8		29.2		30.8
6E	76.0	5.5	18.5	3.5	14.0	21.1		19.3		42.1
6F	80.2	8.0	11.8	6.8	20.5	22.7		29.5		20.5
7B	69.6	5.1	25.3	8.3	2.7	26.6	2.4	36.8	2.4	20.8
7C	79.3	9.0	11.7	11.3	.6	45.4		39.4		3.3
7D	86.2	4.7	9.1	.9	6.4	34.0	2.8	31.8		24.1

TABLE D-15

INDIRECT GENERAL SUPPORT COSTS PRORATED BY PERCENTAGE OF FULL-TIME-EQUIVALENT TEACHERS TO INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1B	472,253	60,836	69,269		4,641	36,159		27,915		884
1C	198,517	18,681	31,882	2,901	3,156	17,312		5,357		3,169
1D	113,690	11,905	29,279	2,840	2,840	9,399	839	8,530		5,831
2B	213,961	7,216	92,550	18,695	9,163	15,363		14,625		34,788
2C	329,817	8,001	106,680	4,267	17,136	12,482	22,509	14,935	5,014	29,077
2D	11,984		5,189	1,490	1,859	2,604		577		1,979
5B	126,022	16,503	24,171		3,577	5,826				14,700
5C	1,988,342	106,303	321,324	11,246	20,565	47,556		64,205		177,692
5D	236,913	5,331	53,898		5,444	14,337		6,245		57,272
5E	34,343		205,818	12,967	4,322	38,693	12,967	17,083		108,780
4B	501,546	41,100	99,538	9,854	1,593	33,146		27,074		77,871
4C	292,014	33,665	52,578	4,049	3,102	16,667		20,926		7,831
4D	156,750	11,756	62,009	20,153	3,349	10,045	3,349	16,184		8,929
5B	213,511	11,725	47,447	4,080	4,508	9,489		4,508		23,862
5C	37,583	999	6,809	701	504	1,900		1,198		3,506
5D	121,810	4,537	48,165	2,986	2,986	10,548	1,494	5,055		24,096
6C	79,520	5,071	30,655		3,403	5,403	2,268	5,671		25,910
6D	327,383	28,384	33,049		3,041	10,179		9,650		20,179
6E	108,046	7,819	26,301	920	3,682	5,550		5,976		11,073
6F	125,793	12,548	18,508	1,259	3,794	4,201		5,469		3,794
7B	693,660	50,824	252,128	20,927	6,807	67,066	6,051	92,783	6,051	52,443
7C	2,092,670	237,504	308,755	34,889	1,853	140,175		121,649		20,189
7D	2,286,942	124,694	241,429	2,173	15,452	82,086	6,760	76,774		58,184

TABLE D-16

NUMBER OF SQUARE FEET OF CLASSROOM SPACE FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1B	137,971	47,460	19,734		2,338	1,796		15,000		
1C	60,150	29,150	16,092			8,952		7,140		
1D	38,964	5,656	5,508					2,680		2,828
2B	113,855	10,593	57,568	6,450	3,604	5,406		8,364		33,744
2C	110,660	16,461	38,577			7,592	1,742	4,071	3,372	21,800
2D	32,100		8,400	1,200	1,200	2,400		1,200		2,400
3B	31,110	4,540	7,100		1,000	1,000				5,100
3C	616,935	52,418	113,462	6,635	5,640	44,953		25,380		30,854
3D	44,605	6,707	39,163		4,584	10,014		4,866		19,699
3E	19,224		99,584	5,477	1,495	18,423	4,680	8,564		60,945
4B	226,399	53,782	72,975	15,920		13,465		17,102		26,485
4C	155,073	52,843	35,068	1,126	1,604	11,227		10,211		20,900
4D	103,259	12,709	43,634	16,232	2,770	6,780		10,062		7,790
5B	99,611	10,003	44,642	3,663	2,571	12,680		5,123		20,605
5C	44,851	4,042	39,674	5,996	1,200	4,042		4,042		24,394
5D	64,990	6,729	57,853	2,468	2,372	23,835	1,215	7,232		10,711
6C	14,952	3,531	15,479		900	1,606	1,200	2,136		9,613
6D	98,461	16,178	23,378		2,255	8,504		6,804		5,815
6E	30,096	5,774	20,002	1,490	3,742	4,485		3,735		6,547
6F	30,393	5,814	10,650	714	3,024	1,869		1,394		3,649
7B	131,215	64,841	133,101	23,420	17,707	27,238	3,250	15,615	13,150	32,721
7C	728,100	152,208	210,192	23,752	1,261	95,427		82,816		6,936
7D	555,029	156,811	148,181	1,072	8,223	57,560	4,108	60,608		16,610

TABLE D-17

PERCENTAGE OF CLASSROOM SPACE FOR INDICATED INSTRUCTIONAL SERVICES & PROGRAMS, BY HIGH SCHOOL DISTRICT, FOR 1969-70. (THE SUM OF COLUMNS 1,2, & 3 EQUALS 100%; THE SUM OF COLUMNS 4-10 EQUALS 100%)

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1B	67.3	23.1	9.6		11.8	9.1		79.1		
1C	57.0	27.7	15.3			55.6		44.4		
1D	77.7	11.3	11.0					48.7		51.3
2B	62.6	5.8	31.6	11.2	6.3	9.4		14.5		58.6
2C	66.8	9.9	23.3			19.7	4.5	10.6	8.7	56.5
2D	79.3		20.7	14.3	14.3	28.5		14.3		28.6
3B	72.8	10.6	16.6		14.1	14.1				71.8
3C	73.1	8.5	18.4	5.9	5.0	39.5		22.4		27.2
3D	49.7	7.4	43.3		11.7	25.6		12.4		50.3
3E	16.2		83.8	5.5	1.5	18.5	4.7	8.6		61.2
4B	63.2	15.0	21.8	20.4		25.7		21.9		34.0
4C	63.9	21.7	14.4	3.2	4.6	32.0		29.1		31.1
4D	64.7	8.0	27.3	37.2	6.3	15.5		23.1		17.9
5B	64.6	6.5	28.9	8.2	5.7	28.4		11.5		46.2
5C	50.5	4.7	44.8	15.1	3.0	10.2		10.2		61.5
5D	50.1	5.2	44.7	4.3	4.1	41.2	2.1	12.5		35.8
6C	54.4	10.4	45.6		5.8	10.3	7.8	13.8		62.3
6D	59.9	16.4	23.7		9.7	36.4		29.0		24.9
6E	53.9	10.3	35.8	7.5	18.7	22.4		18.7		32.7
6F	64.9	12.4	22.7	6.7	28.3	17.6		13.1		34.3
7B	39.9	19.7	40.4	17.6	13.3	20.5	2.4	11.7	9.9	24.6
7C	66.7	14.0	19.3	11.3	.6	45.4		39.4		3.3
7D	64.6	18.2	17.2	.7	5.6	38.8	2.8	40.9		11.2

TABLE D-18

INDIRECT PLANT OPERATION AND MAINTENANCE COSTS PRORATED BY PERCENTAGE OF CLASSROOM SPACE FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1B	575,875	197,663	82,146		9,693	7,475		64,978		
1C	104,771	50,915	28,123			15,636		12,487		
1D	116,571	16,953	16,503					8,037		8,466
2B	163,481	15,147	82,524	9,243	5,199	7,757		11,966		48,359
2C	234,419	34,742	81,766			16,108	3,679	8,667	7,114	46,198
2D	25,562		6,672	954	954	1,902		954		1,908
3B	134,677	19,609	30,709		4,330	4,330				22,049
3C	1,242,560	144,484	312,765	18,453	15,638	123,542		70,059		85,073
3D	106,284	15,953	93,349		10,922	23,897		11,575		46,955
3E	26,401		136,568	7,511	2,049	25,264	6,419	11,745		83,580
4B	334,693	79,437	115,448	23,552		27,361		25,283		39,252
4C	222,239	75,471	50,082	1,603	2,304	16,026		14,574		15,575
4D	93,475	11,558	39,441	14,672	2,485	6,113		9,111		7,060
5B	128,482	12,928	57,479	4,713	3,277	16,324		6,610		26,555
5C	33,433	3,112	29,660	4,479	890	3,025		3,025		18,241
5D	39,801	4,131	35,513	1,527	1,456	14,631	746	4,439		12,714
6C	27,588	6,521	28,592		1,658	2,945	2,230	3,946		17,813
6D	253,733	69,469	100,392		9,738	36,543		29,113		24,936
6E	83,106	15,881	55,199	4,140	10,322	12,365		10,322		18,050
6F	147,725	28,225	51,670	3,462	14,622	9,094		6,769		17,723
7B	361,864	178,675	366,419	64,490	48,733	75,116	8,795	42,871	36,275	90,139
7C	1,171,734	245,941	339,047	38,312	2,034	153,927		133,585		11,189
7D	960,494	270,603	255,735	1,790	14,321	99,225	7,161	104,596		28,642

TABLE D-19

TOTAL INDIRECT COST FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1B	1,525,955	296,933	208,780		17,546	71,399		118,707		1,128
1C	376,204	74,721	71,873	3,542	4,319	40,158		19,802		1,022
1D	285,652	34,297	53,472	3,440	3,740	11,891	1,010	19,302		11,089
2B	507,273	24,030	210,239	34,162	17,035	30,575		32,215		96,252
2C	761,571	45,978	218,945	4,846	23,718	35,941	27,134	29,794	13,379	84,136
2D	94,921		18,343	3,112	3,576	5,770		1,432		4,453
3B	326,069	42,869	67,211		10,077	12,709				44,425
3C	3,371,167	260,010	658,627	29,993	38,534	175,417		139,992		274,691
3D	379,191	22,088	152,746		17,114	39,661		19,146		76,625
3E	64,458		365,851	21,769	6,723	68,298	20,489	30,846		217,726
4B	887,486	123,941	223,370	34,018	1,736	64,020		54,805		68,791
4C	650,429	121,485	123,298	7,035	6,438	39,999		43,858		25,968
4D	278,402	24,541	108,124	36,721	6,348	17,426	3,716	27,170		10,743
5B	371,072	25,683	108,050	8,915	7,988	27,084		11,259		52,804
5C	96,103	4,942	42,445	5,712	2,153	5,600		5,275		23,705
5D	198,127	9,508	93,016	4,915	4,825	29,026	2,436	14,661		37,153
6C	125,518	12,438	64,870		6,214	7,085	4,847	10,708		36,016
6D	690,796	104,392	142,996		13,696	50,201		41,544		37,557
6E	219,738	25,219	86,730	5,186	15,244	19,087		16,376		30,637
6F	307,781	43,580	74,589	4,932	19,553	14,365		13,349		22,140
7B	1,189,402	237,328	643,365	87,229	57,922	154,640	15,045	141,238	42,922	144,369
7C	3,737,956	514,515	678,872	77,085	5,254	307,710		267,134		21,689
7D	3,671,377	422,183	526,451	4,139	31,647	194,461	14,624	191,942		89,638

TABLE D-20

TOTAL COST FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1B	4,005,566	683,034	601,091		49,190	256,676		287,181		8,044
1C	1,533,532	148,672	253,529	21,209	23,398	130,577		61,144		17,201
1D	761,044	79,397	190,195	19,375	17,505	55,664	4,556	56,506		36,589
2B	1,985,269	78,575	776,043	158,548	84,244	124,584		121,836		216,831
2C	2,703,315	86,400	670,350	21,150	106,770	92,697	107,557	94,588	34,373	213,215
2D	297,079		66,795	18,360	13,033	18,349		3,226		13,827
3B	880,552	110,497	226,682		24,685	100,611				103,586
3C	7,764,922	624,016	2,096,887	45,563	97,451	637,453		358,876		257,844
3D	1,148,285	41,742	380,785		40,647	96,158		46,124		203,856
3E	122,058		980,746	73,585	16,833	167,318	$3,904	83,168		585,938
4B	2,662,322	198,540	793,001	97,616	8,330	302,016		181,439		203,000
4C	2,086,809	190,013	350,969	25,184	22,238	138,704		77,775		67,068
4D	800,265	54,521	325,603	98,645	21,432	64,205	7,565	73,872		59,884
5B	1,259,273	62,163	238,340	32,708	31,177	38,319		43,999		82,227
5C	408,826	18,227	175,254	31,807	13,024	20,893		35,870		75,680
5D	1,616,973	31,133	325,428	25,693	24,543	71,045	11,194	56,010		136,945
6C	850,941	36,450	206,227		24,554	18,032	13,264	32,566		117,811
6D	2,687,182	232,046	298,258		28,104	101,059		95,270		73,625
6E	834,979	67,834	216,347	10,221	34,193	49,757		38,997		83,219
6F	1,019,008	105,213	191,683	20,158	44,267	45,924		40,492		40,312
7B	4,496,850	567,727	1,948,007	175,395	90,089	453,297	47,721	494,927	75,888	610,690
7C	9,362,952	1,224,598	1,372,125	176,522	9,692	584,370		558,645		42,896
7D	10,386,438	1,261,289	1,818,977	25,644	67,099	756,801	$7,754	607,365		304,314

TABLE D-21

AVERAGE COST PER STUDENT CONTACT HOUR FOR INDICATED INSTRUCTIONAL SERVICES & PROGRAMS, BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1B	1.00	2.10	1.24		1.82	1.10		1.32		[illegible]
1C	.94	1.28	.95	1.49	.90	.81		1.39		.88
2B	.64	.60	1.02	1.33	.81	.92	1.15	.85		1.90
2D	.68	1.41	.99	1.14	1.40	.75		.97		.97
2C	.71	1.33	1.14	1.89	.89	.65	5.86	.79	1.41	1.38
2D	.77		.90	1.29	.80	.68		1.49		.95
3B	.94	1.14	1.29		.79	2.75				[illegible]
3C	.73	.90	1.12	2.07	.55	1.93		.83		1.05
3D	.68	1.10	1.50		1.17	1.26		1.36		1.82
3E	1.02		1.29	1.76	1.51	1.19	1.50	1.28		1.26
4B	.47	.53	.86	1.45	.53	.78		.68		1.11
4C	.56	.55	.58	.66	.77	.69		.54		[illegible]
4D	.43	.67	.73	.78	.63	.75	.31	.59		1.20
5B	.49	.65	.83	2.93	1.68	.33		3.41		.73
5C	.48	.65	.86	1.75	.50	.90		.94		.75
5D	1.03	.75	.72	1.33	1.32	.38	1.18	.99		.84
6C	1.23	1.18	1.00		.58	.66	1.04	.81		1.30
6D	.89	1.28	1.14		1.12	1.06		1.25		[illegible]
6E	.68	1.05	.97	1.89	.64	.99		.93		1.14
6F	.68	.86	1.03	1.75	.88	.97		.82		[illegible]
7B	.77	1.68	1.80	2.22	.86	.83	5.55	2.03	2.94	[illegible]
7C	.77	1.53	1.73	1.78	.28	1.68		1.84		[illegible]
7D	.45	.87	1.14	2.84	.65	1.06	1.50	1.05		1.09

TABLE D-22

COST RATIOS FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, BY HIGH SCHOOL DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1B	1.00	2.10	1.24		1.82	1.10		1.32		1.60
1C	1.00	1.36	1.01	1.59	.96	.86		1.48		.94
1D	1.00	.94	1.59	2.09	1.27	1.44	1.80	1.33		2.97
2B	1.00	2.07	1.46	1.68	2.06	1.10		1.43		1.43
2C	1.00	1.87	1.61	2.66	1.25	.92	8.25	1.11	1.99	1.94
2D	1.00		1.17	1.68	1.04	.88		1.94		1.23
3B	1.00	1.21	1.37		.84	2.93				1.00
3C	1.00	1.23	1.53	2.84	.75	2.64		1.14		1.44
3D	1.00	1.62	2.21		1.72	1.85		2.01		2.68
3L	1.00		1.26	1.73	1.48	1.17	1.47	1.25		1.24
4B	1.00	1.13	1.83	3.09	1.13	1.66		1.45		2.36
4C	1.00	.98	1.04	1.18	1.38	1.23		.61		1.70
4D	1.00	1.56	1.70	1.81	1.47	1.77	.72	1.37		2.79
5B	1.00	1.33	1.69	5.98	3.43	.67		6.96		1.49
5C	1.00	1.35	1.79	3.65	1.04	1.88		1.96		1.56
5D	1.00	.73	.70	1.29	1.28	.37	1.15	.96		.82
6C	1.00	.96	.81		.47	.54	.85	.66		1.13
6D	1.00	1.44	1.28		1.26	1.19		1.30		1.27
6E	1.00	1.54	1.43	2.78	.94	1.46		1.32		1.69
6F	1.00	1.26	1.51	2.57	1.29	1.43		1.21		2.18
7B	1.00	2.18	2.34	2.88	1.12	1.08	7.21	2.64	3.82	20.12
7C	1.00	1.99	2.25	2.31	.36	2.18		2.30		6.38
7E	1.00	1.93	2.53	6.31	1.44	2.36	3.33	2.33		4.42

APPENDIX E

COMMUNITY COLLEGE DISTRICT COST DATA AND COST RATIOS

TABLE ABBREVIATIONS

O.I.P.	--	Other Instructional Programs
I.A.	--	Industrial Arts Service
T.O.C.	--	Total Vocational Service
AG.	--	Agricultural Programs
D.E.	--	Distributive Programs
OFF.	--	Office Programs
HLTH.	--	Health Programs
H.E.	--	Home Economics Programs
TECH.	--	Technical Programs
T & I	--	Trade & Industry Programs

TABLE E-1

DIRECT CURRENT EXPENDITURES FOR COURSES IN AGRICULTURE,
BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	Voc. Dir. Exp.	Supv. Sal.	Tchr. Sal.	Other Sal.	Sec. Sal.	Textbk. Exp.	Supplies Exp.	Replace. Equip. Exp.	Travel Exp.	Equip. Rent Exp.	Contr. Serv. Exp.	Maint. Equip. Exp.	Other Exp.
1A													
2A	2,532		10,925		729	5	24						
3A	1,258	696	4,158		436	24	813	103	232				
4A													
5A	902		15,600		1,922		1,968	2,288	450			195	
6A													
7A													

TABLE E-2

DIRECT CURRENT EXPENDITURES FOR COURSES IN DISTRIBUTION,
BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	Voc. Dir. Exp.	Supv. Sal.	Tchr. Sal.	Other Sal.	Sec. Sal.	Textbk. Exp.	Supplies Exp.	Replace. Equip. Exp.	Travel Exp.	Equip. Rent Exp.	Contr. Serv. Exp.	Maint. Equip. Exp.	Other Exp.
1A	4,117		77,609	1,760			907	5,986	1,001		2,484		
2A													
3A	1,154	639	10,933		401	22	746	95	213				
4A													
5A	2,561		19,849				1,996	23,912	50				
6A													
7A	6,876	935	55,570		1,262		920						

TABLE E-3

DIRECT CURRENT EXPENDITURES FOR COURSES IN OFFICE,
BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	Voc. Dir. Exp.	Supv. Sal.	Tchr. Sal.	Other Sal.	Sec. Sal.	Textbk. Exp.	Supplies Exp.	Replace. Equip. Exp.	Travel Exp.	Equip. Rent Exp.	Contr. Serv. Exp.	Maint. Equip. Exp.	Other Exp.
1A	2,378		44,921	1,019			525	3,465	579		1,437		
2A	2,082		5,200		599	45	48				645		
3A	2,366	1,311	17,575		822	44	1,530	194	436				
4A		3,939	29,679				3,145		152				
5A	10,208		105,895		10,649		8,975	59,502	663			163,436	
6A	8,242	5,865	86,403		2,750		3,736	4,013	452		679		
7A	13,752	8,325	323,017		2,523		2,285	250	285	66,073	4,360		

TABLE E-4

DIRECT CURRENT EXPENDITURES FOR COURSES IN HEALTH,
BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	Voc. Dir. Exp.	Supv. Sal.	Tchr. Sal.	Other Sal.	Sec. Sal.	Textbk. Exp.	Supplies Exp.	Replace. Equip. Exp.	Travel Exp.	Equip. Rent Exp.	Contr. Serv. Exp.	Maint. Equip. Exp.	Other Exp.
1A	5,672		199,717	7,696			5,290	10,629	1,931		1,539		
2A	742		1,752		214		156						
3A													
4A													
5A	1,482		38,985		1,204		812	192	624			197	
6A	4,333	8,150	124,087		7,802		1,964	357	237		357		
7A	10,314	20,120	334,224		1,892		16,035		1,775				

TABLE E-5

DIRECT CURRENT EXPENDITURES FOR COURSES IN HOME ECONOMICS,
BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	Voc. Dir. Exp.	Supv. Sal.	Tchr. Sal.	Other Sal.	Sec. Sal.	Textbk. Exp.	Supplies Exp.	Replace. Equip. Exp.	Travel Exp.	Equip. Rent Exp.	Contr. Serv. Exp.	Maint. Equip. Exp.	Other Exp.
1A	1,021		42,254	293			451	1,023	155		522		
2A	2,373		5,725		683	151	241		180				
3A	533	295	5,480		185	10	344	44	98				
4A		4,526	21,006				2,710						
5A													
6A													
7A	688	458	19,692		126		264						

TABLE E-6

DIRECT CURRENT EXPENDITURES FOR COURSES IN TECHNICAL,
BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	Voc. Dir. Exp.	Supv. Sal.	Tchr. Sal.	Other Sal.	Sec. Sal.	Textbk. Exp.	Supplies Exp.	Replace. Equip. Exp.	Travel Exp.	Equip. Rent Exp.	Contr. Serv. Exp.	Maint. Equip. Exp.	Other Exp.
1A	8,233		122,848	2,563			5,615	11,165	1,215		1,551		
2A	1,732		3,793	-	499		99						
3A													
4A		2,259	14,450				1,193		65				
5A	3,610		49,056		9,889		40,628	17,892	761			4,009	
6A	5,111	9,294	96,037		3,676		2,317	2,226	280		421		
7A	20,628	9,794	229,247		3,785		25,831						

TABLE E-7

DIRECT CURRENT EXPENDITURES FOR COURSES IN TRADE & INDUSTRY,
BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	Voc. Dir. Exp.	Supv. Sal.	Tchr. Sal.	Other Sal.	Sec. Sal.	Textbk. Exp.	Supplies Exp.	Replace. Equip. Exp.	Travel Exp.	Equip. Rent Exp.	Contr. Serv. Exp.	Maint. Equip. Exp.	Other Exp.
1A	549		11,390	85			137	305	44		141		
2A	5,095		15,286		1,467	252	1,078						
3A	3,877	2,144	28,555		1,350	73	2,505	318	714				
4A		4,103	29,814				3,796		929				
5A	10,048		115,871		9,725		50,623	40,912	1,364			65,347	
6A													
7A	13,752	4,716	229,048		2,523		17,825						

TABLE E-8

TOTAL DIRECT CURRENT EXPENDITURES FOR INDICATED INSTRUCTIONAL SERVICES & PROGRAMS BY COMMUNITY COLLEGE DISTRICT FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1A	1,032,040		595,122		93,864	54,324	232,474	46,619	153,190	12,651
2A	175,263		64,355	14,215		8,619	2,864	9,356	6,123	23,178
3A	32,821		92,726	7,720	14,203	24,278		6,989		39,536
4A	399,749		121,766			36,915		28,242	17,967	38,642
5A	145,207		894,342	23,415	48,368	359,328	43,496		125,845	293,850
6A	1,014,323		378,789			112,140	147,287		119,362	
7A	4,273,082		1,449,170		65,563	420,870	384,390	21,228	289,285	267,864

TABLE E-9

ANNUAL NUMBER OF STUDENT CONTACT HOURS FOR INDICATED INSTRUCTIONAL SERVICES & PROGRAMS, BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1A	1,373,848		472,962		84,980	49,032	117,102	39,762	170,058	11,148
2A	159,585		62,756	10,931		8,956	3,195	10,291	7,437	22,036
3A	82,890		46,041	5,129	5,267	15,263		4,871		15,511
4A	541,840		114,137			32,335		25,070	33,491	25,241
5A	545,328		578,927	19,836	51,221	204,174	29,646		72,198	201,852
6A	811,125		258,368			72,224	104,832		81,312	
7A	5,359,481		1,255,826		107,855	430,584	168,641	17,292	247,819	283,635

TABLE E-10

PERCENTAGE OF STUDENT CONTACT HOURS FOR INDICATED INSTRUCTIONAL SERVICES & PROGRAMS, BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70. (THE SUM OF COLUMNS 1,2, & 3 EQUALS 100%; THE SUM OF COLUMNS 4-10 EQUALS 100%)

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1A	74.4		25.6		18.0	10.0	25.0	9.0	36.0	2.0
2A	71.8		28.2	17.4		14.3	5.1	16.3	11.8	35.1
3A	64.3		35.7	11.1	11.4	33.2		10.6		33.7
4A	82.6		17.4			28.3		22.0	29.3	20.4
5A	48.5		51.5	3.4	8.8	35.3	5.1		12.5	34.9
6A	75.8		24.2			28.0	40.5		31.5	
7A	81.0		19.0		8.6	34.3	13.4	1.4	19.7	22.6

TABLE E-11

INDIRECT INSTRUCTIONAL SUPPORT COSTS PRORATED BY PERCENTAGE OF STUDENT CONTACT HOURS TO INDICATED INSTRUCTIONAL SERVICES & PROGRAMS, BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1A	310,462		106,825		19,229	10,683	26,706	9,614	38,457	2,136
2A	40,429		15,879	2,763		2,271	810	2,588	1,874	8,573
3A	628		349	39	40	116		37		117
4A	56,393		11,879			3,362		2,613	3,481	3,423
5A	38,663		41,054	1,396	3,612	14,492	2,094		5,132	14,328
6A	47,157		15,056			4,216	6,097		4,743	
7A	94,580		22,185		1,908	7,609	2,973	311	4,370	5,014

TABLE E-12

FULL-TIME-EQUIVALENT TEACHERS FOR INDICATED INSTRUCTIONAL PROGRAMS & SERVICES, BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1A	36.3		33.4		6.3	2.5	5.5	2.4	15.2	1.5
2A	22.0		12.0	2.0		2.0	1.0	4.0	1.0	2.0
3A	6.4		5.0	.3	.7	1.3		.9		1.8
4A	30.3		12.3			3.0		2.0	4.0	3.3
5A	29.1		27.3	1.2	3.0	7.5	1.1		7.0	7.5
6A	58.8		16.2			6.6	3.8		5.8	
7A	220.0		104.0		6.5	28.5	25.0	1.5	20.5	22.0

TABLE E-13

PERCENTAGE OF FULL-TIME-EQUIVALENT TEACHERS FOR INDICATED INSTRUCTIONAL SERVICES & PROGRAMS, BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70. (THE SUM OF COLUMNS 1,2, & 3 EQUALS 100%; THE SUM OF COLUMNS 4-10 EQUALS 100%)

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1A	52.1		47.9		18.9	7.5	16.5	7.2	45.4	4.5
2A	64.7		35.3	16.7		16.7	8.3	33.3	8.3	16.7
3A	56.0		44.0	6.6	14.9	24.8		17.4		36.3
4A	71.2		28.8			24.5		16.3	33.7	25.5
5A	51.6		48.4	4.4	11.0	27.5	4.0		35.6	17.5
6A	78.4		21.6			40.9	23.2		35.9	
7A	67.9		32.1		6.3	27.4	24.0	1.4	12.7	28.2

TABLE E-14

INDIRECT GENERAL SUPPORT COSTS PRORATED BY PERCENTAGE OF FULL-TIME-EQUIVALENT TEACHERS TO INDICATED INSTRUCTIONAL SERVICES & PROGRAMS, BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1[illegible]	215,280		197,925		37,408	14,844	32,658	14,251	89,857	8,907
2[illegible]	45,702		24,935	4,164		4,164	2,070	8,303	2,070	4,164
3[illegible]	22,151		17,404	1,149	2,593	4,316		3,028		6,318
4[illegible]	116,689		47,200			11,564		7,694	15,434	12,508
5[illegible]	173,736		162,962	7,170	17,926	44,815	6,518		41,718	44,815
6[illegible]	525,021		144,649			59,161	33,559		51,929	
7[illegible]	1,706,413		806,713		50,823	221,039	193,611	11,295	158,922	171,023

TABLE E-15

NUMBER OF SQUARE FEET OF CLASSROOM SPACE FOR INDICATED INSTRUCTIONAL SERVICES & PROGRAMS, BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1A	38,618		13,854		742	2,368	2,272	1,952	5,020	1,500
2A	13,484		28,000	12,000		1,500		2,500		12,000
3A	6,408		14,126	2,018	900	1,636		1,500		8,072
4A	24,949		17,391			2,166		2,333	3,078	9,814
5A	48,312		42,434	1,443	3,734	14,979	2,164		5,304	14,810
6A	23,958		15,136			5,449	3,633		6,054	
7A	112,884		77,022		6,624	17,407	10,321	1,078	15,173	26,419

TABLE E-16

PERCENTAGE OF CLASSROOM SPACE FOR INDICATED INSTRUCTIONAL SERVICES & PROGRAMS, BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70. (THE SUM OF COLUMNS 1,2, & 3 EQUALS 100%; THE SUM OF COLUMNS 4-10 EQUALS 100%)

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1A	73.6		26.4		5.4	17.1	16.4	14.1	36.2	10.8
2A	32.5		67.5	42.9		5.3		8.9		42.9
3A	31.2		68.8	14.3	6.4	11.6		10.6		57.1
4A	58.9		41.1			12.5		13.4	17.7	56.4
5A	53.2		46.8	3.4	8.8	35.3	5.1		12.5	34.9
6A	61.3		38.7			36.0	24.0		40.0	
7A	59.4		40.6		8.6	22.6	13.4	1.4	19.7	34.3

TABLE E-17

INDIRECT PLANT OPERATION & MAINTENANCE COSTS PRORATED BY PERCENTAGE OF CLASSROOM SPACE FOR INDICATED INSTRUCTIONAL SERVICES & PROGRAMS, BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1A	162,085		58,139		3,140	9,942	9,535	8,198	21,045	6,279
2A	12,024		24,973	10,713		1,324		2,223		10,713
3A	3,665		8,031	1,156	517	937		857		4,614
4A	114,009		79,554			9,944		10,660	14,081	44,869
5A	125,084		110,036	3,741	9,683	38,843	5,612		13,755	38,402
6A	62,816		39,657			14,276	9,518		15,863	
7A	700,671		478,910		41,186	108,234	64,174	6,705	94,345	164,266

TABLE E-18

TOTAL INDIRECT COST FOR INDICATED INSTRUCTIONAL SERVICES AND PROGRAMS, BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1A	687,827		362,889		59,777	35,469	68,899	32,063	149,359	17,322
2A	98,155		65,787	17,640		7,759	2,880	13,114	3,944	20,450
3A	26,444		25,834	2,344	3,150	5,369		3,922		11,049
4A	287,091		138,633			24,870		20,967	32,996	59,600
5A	337,483		314,052	12,307	31,221	98,150	14,224		60,605	97,545
6A	634,994		199,362			77,653	49,174		72,535	
7A	2,501,664		1,307,808		93,917	336,882	260,758	18,311	257,637	340,303

TABLE E-19

TOTAL COST FOR INDICATED INSTRUCTIONAL SERVICES & PROGRAMS,
BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1A	2,320,467		956,011		153,641	89,793	301,373	78,682	302,549	29,973
2A	273,418		130,142	31,855		16,378	5,744	22,470	10,067	43,628
3A	59,265		118,560	10,064	17,353	29,647		10,911		50,585
4A	686,840		260,399			61,785		49,209	50,963	98,442
5A	482,690		1,208,394	35,722	79,589	457,478	57,720		186,450	391,435
6A	1,649,317		578,151			189,793	196,461		191,897	
7A	6,774,746		2,756,978		159,480	757,752	645,118	39,539	546,922	608,167

TABLE E-20

AVERAGE COST PER STUDENT CONTACT HOUR FOR INDICATED INSTRUCTIONAL SERVICES & PROGRAMS, BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1A	1.69		2.02		1.81	1.83	2.57	1.98	1.77	2.69
2A	1.71		2.07	2.91		1.83	1.80	2.20	1.55	1.98
3A	1.61		2.58	1.96	3.29	1.94		2.24		3.26
4A	1.27		2.28			1.91		1.96	1.52	4.24
5A	.89		2.09	1.80	1.55	2.24	1.95		2.58	1.94
6A	2.03		2.24			2.63	1.87		2.36	
7A	1.26		2.20		1.48	1.76	3.83	2.29	2.21	2.14

TABLE E-21

COST RATIOS FOR INDICATED INSTRUCTIONAL SERVICES & PROGRAMS,
BY COMMUNITY COLLEGE DISTRICT, FOR 1969-70

Dist.	(1) O.I.P.	(2) I.A.	(3) T.O.C.	(4) Ag.	(5) D.E.	(6) Off.	(7) Hlth.	(8) H.E.	(9) Tech.	(10) T & I
1A	1.00		1.20		1.07	1.08	1.52	1.17	1.05	1.59
2A	1.00		1.21	1.70		1.07	1.05	1.29	.79	1.16
3A	1.00		1.60	1.22	2.04	1.21		1.39		2.02
4A	1.00		1.80			1.50		1.54	1.20	3.34
5A	1.00		2.35	2.02	1.74	2.52	2.19		2.90	2.18
6A	1.00		1.10			1.30	.92		1.16	
7A	1.00		1.75		1.17	1.40	3.04	1.82	1.75	1.70